

XX Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
KW botulism; BotB.
XX
OS
OS Clostridium botulinum; serotype B strain Eklund 17B.
XX
XX
FH Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX W09808540-A1.
PN XX
PD 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
PF
XX 28-AUG-1996; 96US-00704159.
PR
XX (OPHI-) OPHIDIAN PHARM INC.
PA
PI Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
DR N-PSDB; AAV30580.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 35; Page 300-302; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (Eklund 17B strain) type B toxin, encoded by a DNA
CC sequence (see AAV30580) in plasmid pHisBotB. This vector was used to
CC express soluble C fragment in Escherichia coli host cells, and the
CC recombinant C fragment was purified on an affinity column. The invention
CC relates to recombinant proteins derived from C. botulinum toxins. Methods
CC are provided which allow for the isolation of soluble recombinant
CC proteins free of significant endotoxin contamination. Preferred hosts for
CC production of recombinant proteins are E. coli, insect cells and yeast
CC cells. The recombinant toxins are used as immunogens for the production
CC of vaccines and antitoxins that are useful in the treatment of humans and
CC animals at risk of intoxication with clostridial toxin
XX
SQ Sequence 472 AA;
AAW68393 Length: 472 August 31, 2004 14:39 Type: P Check: 5316 ..
Found using 'seq23' (hayes346.key)
...
19 GRHMASDITLIEMFNKYNSEILNINILNRYRDNLDLSGAKVEYDGVKLDKN
|---|
69 72
79 QFKLTSSADSKIRVTQNLIIFNMFDFSVFWIRPKYRNDIDIQNIHNEYIINCMMK
|---|
131
139 NNSGWKISIRGNRIIWLIDINGKTSVFFEYNIREDISEYINRF
...
189 TNNLDNAKIYINGTLESNMDIKDIGEVINGEITFKLDGVDVDTQTFWKKYFIFNTQLN
|---|
239
249 QSNKEIKYQSYSEYLFKDFWGNPLMYNKNFNAGNKNYSYIKLVKDSVSGEILIRSKY
|---|
261
279
290
|---|

309 NQNSNYINRYNLXIGEXFIIRRESNQSINDIVRKEDYTHLDLVLHHEBWRVYAYKFK
|---| |---|
314 347 364
369 EQEKKFLSIISDSNFEYKTIETKEVDEQPSYSCQLLFKKDESDTDDIGLIGHRFYESG
|---|
386
429 VLRKKYKDYFCISKWYLKEVKRKPYSNLCNMQWQFIPKDEGWTE
|---| |---|
434 437

14 matches found in sequence:
aaw68394; Clostridium botulinum toxin B C fragment.
(from "bc_ags.pep")
TOIG of: aaw68394 check: 3754 from: 1 to: 472
ID AAW68394 standard; protein; 472 AA.
XX
AC AAW68394;
XX
DT 07-DEC-1998 (first entry)
XX
DE Clostridium botulinum toxin B C fragment.
XX
KW Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
KW botulism; BotB.
XX
OS Clostridium botulinum; serotype B Danish strain.
OS Synthetic.
XX
FH Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX W09808540-A1.
PN
XX
PD 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
PF
XX 28-AUG-1996; 96US-00704159.
PR
XX (OPHI-) OPHIDIAN PHARM INC.
PA
XX Williams JA, Thalley BS;
PI
XX
XX WPI; 1998-230234/20.
DR N-PSDB; AAV30581.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 35; Page 303-305; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (Danish strain) type B toxin, encoded by a DNA
CC sequence (see AAV30581) in plasmid pHisB. This vector was used to
CC express soluble C fragment in Escherichia coli host cells, and the
CC recombinant C fragment was purified on an affinity column. The invention
CC relates to recombinant proteins derived from C. botulinum toxins. Methods
CC are provided which allow for the isolation of soluble recombinant
CC proteins free of significant endotoxin contamination. Preferred hosts for
CC production of recombinant proteins are E. coli, insect cells and yeast
CC cells. The recombinant toxins are used as immunogens for the production
CC of vaccines and antitoxins that are useful in the treatment of humans and
CC animals at risk of intoxication with clostridial toxin
XX

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SQ      Sequence 472 AA;
AAW68394 Length: 472 August 31, 2004 14:39 Type: P Check: 3754
Found using 'seq23' (hayes346.key)
...
19      GRHMASMDTILIEFNKYNSEILNIIILNRYKONNLDLSGGYAKVVEYDGVLELNDKN
      69 72
79      QFKLTSSANSKIRVTQCNLIIFNSVFLDFSVSWIRIPKYKNDGIQNIHNEYTIINCMK
      131
139     NNSGWKTSIRGNRIIWTLIDINGTKSVFFPEYNIREDISSEYINRWF
...
189     TNNLNAKIYINGKLESNTDIKDIREVIANGELIIFKLDGDIRTQFIWMKYFSIFNTELS
      239
249     QSNIEERYKIQSYGYELKDFWGNPLMVNKEYMFENAGNKNYSYIKLKXKDSPPVGEILTRSKY
      261 279 290
309     NQNSKYNIRDLYIGEKFIIRKNSQSINDDIVRKEDIYIDFFNLNQEWVRVYTYKFK
      314 317 347 349
369     KEEKLFLAPISDSDEFYNTTIQIKEYDEQPTYSCQLLPKDEESTDEIGLGIHRFYESG
      386
429     IVFEYKDYFCISKWYLKVRKPKYNLKLGCNQWQIPKDEGWTE
      434 437

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12 matches found in sequence:
aaw68395 ; Clostridium botulinum toxin E C fragment.
(from "bt_ags.pep")
TOIG of: aaw68395 check: 1515 from: 1 to: 451

ID      AAW68395 standard; protein; 451 AA.
XX
AC      AAW68395;
XX
DT      07-DEC-1998 (first entry)
XX
DE      Clostridium botulinum toxin E C fragment.
XX
KW      Antitoxin; vaccine; neurotoxin; toxin E; intoxication; immunogen;
      botulism; BotE.
XX
OS      Clostridium botulinum; serotype E strain Belgium.
XX
OS      Synthetic.
XX
EH      Key
      Location/Qualifiers
FT      Peptide
      1..21
      /note= "N-terminal His tag"
XX
XX      WO9808540-A1.
XX
XX      05-MAR-1998.
XX
XX      28-AUG-1997; 97WO-US015394.
XX
XX

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PR      28-AUG-1996; 96US-00704159.
XX
XX      (OPHI-) OPHIDIAN PHARM INC.
XX
PI      Williams JA, Thalley BS;
XX
DR      WPI; 1998-230234/20.
XX
DR      N-PSDB; AAV30584.
XX
PT      Host cell containing recombinant expression vector encoding Clostridium
PT      botulinum type B or E toxin - useful to treat humans and other animals at
PT      risk of intoxication with clostridial toxin.
XX
PS      Example 41; Page 324-325; 428pp; English.
XX
CC      This is the amino acid sequence of the histidine-tagged C fragment of
CC      Clostridium botulinum (Belgus strain) type E neurotoxin, encoded by a DNA
CC      sequence (see AAV30584) in plasmid pETHisB. This vector is used to
CC      express BotE soluble C fragment in Escherichia coli host cells, and the
CC      recombinant C fragment was purified on an affinity column. The invention
CC      relates to recombinant proteins derived from C. botulinum toxins,
CC      especially type B and type E toxins. Methods are provided which allow for
CC      the isolation of soluble recombinant proteins free of significant
CC      endotoxin contamination. Preferred hosts for production of recombinant
CC      proteins are E. coli, insect cells and yeast cells. The recombinant
CC      toxins are used as immunogens for the production of vaccines and
CC      antitoxins that are useful in the treatment of humans and animals at risk
CC      of intoxication with clostridial toxin
XX
SQ      Sequence 451 AA;
AAW68395 Length: 451 August 31, 2004 14:39 Type: P Check: 1515
Found using 'seq23' (hayes346.key)
...
55      MRYKNDKYVDTSGYDSNININGDVVYKPTKNQGIYNDKLSSEVNISQNDYIIYDNKYKN
      115 137 105 112
115     FSISEFWRIPNYDNKNVNNVEYTIINCRRDNRNSGWKVSIAHNEIITWLQDSNGINQKLA
      137
175     FNYGNANGISDYINKWIFVTITNDRLGDSKLYINGNLIDKKSILNLGNHIVSDNILEFKIV
      177
235     NCSYTRYIGIRYFNIFDKELDETEIQTLYNNEPNANILKDFWGNLYLLYDKEYILLNLVKP
      238 246 279 286
295     NNFINRRDSTLSINNIRSTILLANRLYSYGKVKVQIQRVNNSSSTNDNLVRKNDQVYINFA
      322 349
355     SKTHLLPLYADTATTNKEKTIKISSSGNRFPQVVVMSVGNCTMNFKNNGNIGLLGFK
415     ADTVVASTWYTYTHREDNTNSNGFFWNFISEHGWOEK
      425

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12 matches found in sequence:
aaw68396 ; Clostridium botulinum toxin E C fragment.
(from "bt_ags.pep")
TOIG of: aaw68396 check: 4403 from: 1 to: 452

ID      AAW68396 standard; protein; 452 AA.
XX
AC      AAW68396;

```

DE Clostridium botulinum type B toxin.
 XX
 KW Antitoxin; vaccine; neurotoxin; toxin B; intoxication; immunogen;
 KW botulism; BotB.
 OS
 XX Clostridium botulinum; serotype B Danish strain.
 PN WO9808540-A1.
 XX
 PD 05-MAR-1998.
 XX
 PF 28-AUG-1997; 97WO-US015394.
 XX
 PR 28-AUG-1996; 96US-00704159.
 XX
 PA (OPHI-) OPHIDIAN PHARM INC.
 XX
 PI Williams JA, Thalley BS;
 XX
 DR WPI; 1998-230234/20.
 DR N-PSDB; AAV30579.
 XX
 PT Host cell containing recombinant expression vector encoding Clostridium
 PT botulinum type B or E toxin - useful to treat humans and other animals at
 PT risk of intoxication with clostridial toxin.
 XX
 PS Example 35; Page 291-296; 428pp; English.
 XX
 CC This is the amino acid sequence of the type B toxin of Clostridium
 CC botulinum Danish strain. The C fragment (see AAW68393-94) of the serotype
 CC B toxin has been expressed as a histidine-tagged protein in Escherichia
 CC coli. The invention relates to C. botulinum recombinant toxins. Methods
 CC are provided which allow for the isolation of soluble recombinant
 CC proteins free of significant endotoxin contamination. Preferred hosts for
 CC production of the recombinant proteins are E. coli, insect cells and
 CC yeast cells. The recombinant proteins are used as immunogens for the
 CC production of vaccines and antitoxins that are useful in the treatment of
 CC humans and animals at risk of intoxication with clostridial toxin.
 CC (Updated on 17-OCT-2003 to standardise OS field)
 XX
 SQ Sequence 1291 AA;
 AAW68392 Length: 1291 August 31, 2004 14:39 Type: P Check: 9788 ..
 Found using 'seq23' (hayes346.key)
 1 MPVTINNFYNDPIDNNNIIMPEPPFARGTGRYKAFKITDRWIIPERYTRGKPEDFN
 33 36
 34 37
 61 KSSGIFNRDVCYDYPDYLNTNDKKN I
 ...
 149 ERKKGIFANLIIFGPGVILNENETIDIGIQNHFASEGPGGIMQMCKFCEYVSFVNNVQE
 199
 209 NKGASIFNRGYFSDPALILMELIHVLHGLYGIKVDDLIIVPNEKKFFMQSTDAIQABE
 269 LYTGGQDPSIITPSTDKSYDKVLQNFNGIYDRLNKLVCISDNPININIVKNFKPKY
 289
 329 KFEVDSGKYSIDVSEFDKLYKSLMFGFTETNAENYKIKTRASYFSDSLPPVKIKNLLD
 331
 349
 389 NEIYTIERGFINISDKMEKBYRGQWKAINKQAYEISKEHLAVYKIQMCKSVKAFGICID
 421

449 VNEDLFFIADKNSFSDDLKNERIE
 ...
 520 VYEKQPAIKKIFTDENTIFQYLYSQTFLLDIRDISLTSSFDALLFSNKVYSSFFSMDYIK
 570
 580 TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMDKIADISLIVPYIGIALNVGNETAKGNF
 623
 640 ENAFEIAGASILLEFIPELLIPVVGAFLLSYIDNKNKIITIDNALTNRNEKWSMDYGL
 697
 700 IVAQWLSTVNTQFYTIKEGMYKALNYQQALEELIKRYNIYSEKEKSININIDFNDSK
 738
 760 LNEGINQAIHNINNFINGCSVSYLMKKMIPLA
 ...
 838 FDLSTYNTDILIEFMFNKYNSEILANNIILNLFYKDNLLIDLSSYGAKVEVDGVELNDKN
 888
 898 QFKLTSSANSKIRVTQNNQNIENSVELDFSVSWIRIPKYKNDGIONYIHNEYTYINCWK
 950
 958 NNSGKISIRGNRIIWTLLIDINGTKSVFFEYNIREDISEYINRWF
 ...
 1008 TNNLANAKIYNGKLESNTDIKDIREVIANGELIFKLDGIDIDRTQFIWKKYFSIFNTELS
 1058
 1068 QSNIEERYKIOSYSEYKDFWGNFLMYNKEYYMFNAGNKNYSYIKLKKDSPVGEILLTRSKY
 1080
 1098
 1128 NQNSKYINVRDLYIGEKFILRRKNSQSINDIVRKEDYIYLDFFNLNQEWRYVYTKYFK
 1133
 1136
 1166
 1168
 1188 KEEKLFLAPISDSDEFYNTIQIKEYHQPTYSCQLLFPKDBESTDEIGLIGIHRFYESG
 1205
 1248 IVFEYKDYFCISKWYLKEVRKPYNLKLGCNWQFIPKDEGWTE
 1253
 1256

 13 matches found in sequence:
 aaw68393 ; Clostridium botulinum toxin B C fragment.
 (from "bt_ags.pep")
 TOIG of: aaw68393 check: 5316 from: 1 to: 472
 ID AAW68393 standard; protein; 472 AA.
 XX
 AC AAW68393;
 XX
 DT 07-DEC-1998 (first entry)
 XX
 DE Clostridium botulinum toxin B C fragment.

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SQ Sequence 462 AA;
AAW68390 Length: 462 August 31, 2004 14:39 Type: P Check: 780
Found using 'seq23' (hayes346.key)
...
50 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLEFNLESSKIEVILKNAIVNYSMEYENFST
100 104
110 SFWRIPKYFNSISLNNEYTIINCMMENSGWKVSLNYGEIITWLTQDTEIKQVVFYKYSQ
128 146 167
170 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKPIISNLGNIHASNNIMFKLDGCRDT
230 HRYIWKYFNLFDKELNEKEIKDYDNQNSGILKDFWGDYLDQYDKPYMLNLYDPNKYV
232 237 270 277 288
290 DVNVVGIRGYMYLKGPRGSVMTTNIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
291 299 347
350 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKKMWLQDNN
350 357
410 G
...
13 matches found in sequence:
aaw68391 ; Clostridium botulinum toxin A fragment C (His-tagged).
(from "bt_ags.pep")
TOIG of: aaw68391 check: 9134 from: 1 to: 445
ID AAW68391 standard; protein; 445 AA.
XX AC AAW68391;
XX DT 07-DEC-1998 (first entry)
XX DE Clostridium botulinum toxin A fragment C (His-tagged).
XX KW Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
XX OS Clostridium botulinum; serotype A.
XX OS Synthetic.
XX FH Key Location/Qualifiers
XX FT Peptide 1..7
XX FT /note= "N-terminal histidine tag"
XX PN WO9808540-A1.
XX PD 05-MAR-1998.
XX PF 28-AUG-1997; 97WO-US015394.
XX PR 28-AUG-1996; 96US-00704159.
XX PA (OPHI-) OPHIDIAN PHARM INC.
XX PI Williams JA, Thalley BS;
XX
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DR WPI; 1998-230234/20.
XX N-PSDB; AAV30576.
PT Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX PS Example 29; Page 279-281; 428pp; English.
XX
XX CC This is the amino acid sequence of a histidine-tagged fragment C
XX polypeptide of Clostridium botulinum serotype A toxin encoded by a DNA
XX sequence (see AAV30576) in plasmid p6HisBot(syn). This vector was used to
XX express native soluble C fragment in Escherichia coli host cells, with
XX the recombinant C fragment being purified on a poly-histidine binding
XX affinity resin. The invention relates to recombinant proteins derived
XX from C. botulinum toxins. Methods are provided which allow the isolation
XX of soluble recombinant proteins that are free of significant endotoxin
XX contamination. Preferred hosts for production of recombinant proteins are
XX E. coli, insect cells and yeast cells. The recombinant toxins are used as
XX immunogens for the production of vaccines and antitoxins that are useful
XX in the treatment of humans and animals at risk of intoxication with
XX clostridial toxin
XX
XX SQ Sequence 445 AA;
AAW68391 Length: 445 August 31, 2004 14:39 Type: P Check: 9134
Found using 'seq23' (hayes346.key)
...
33 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLEFNLESSKIEVILKNAIVNYSMEYENFST
83 86 87 90
93 SFWRIPKYFNSISLNNEYTIINCMMENSGWKVSLNYGEIITWLTQDTEIKQVVFYKYSQ
111 129 150
153 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKPIISNLGNIHASNNIMFKLDGCRDT
153
213 HRYIWKYFNLFDKELNEKEIKDYDNQNSGILKDFWGDYLDQYDKPYMLNLYDPNKYV
215 220 253 260 271
273 DVNVVGIRGYMYLKGPRGSVMTTNIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
274 282 330
333 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKKMWLQDNN
333 340
393 G
...
-----
26 matches found in sequence:
aaw68392 ; Clostridium botulinum type B toxin.
(from "bt_ags.pep")
TOIG of: aaw68392 check: 9788 from: 1 to: 1291
ID AAW68392 standard; protein; 1291 AA.
XX AC AAW68392;
XX DT 17-OCT-2003 (revised)
XX DT 07-DEC-1998 (first entry)
XX
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DT 17-OCT-2003 (revised)
DT 07-DEC-1998 (first entry)
XX Clostridium botulinum toxin A fragment C.
XX Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
KW botulism.
XX Clostridium botulinum; serotype A.
FH Key Location/Qualifiers
FT Misc-difference 1..2
FT /note= "vector-derived amino acid residues"
XX
XX WO9808540-A1.
XX 05-MAR-1998.
XX 28-AUG-1997; 97WO-US015394.
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30571.
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX Example 22; Page 262-263; 428pp; English.
XX This is the amino acid sequence of Clostridium botulinum serotype A toxin
CC C-fragment expressed by a DNA sequence (see AAV30571) in plasmid
CC pAlterBot. Recombinant C-fragment proteins have been produced in
CC Escherichia coli as fusion proteins with either maltose binding protein
CC relates to recombinant proteins derived from C. botulinum toxins. Methods
CC are provided which allow for the isolation of soluble recombinant toxin
CC proteins free of significant endotoxin contamination. Preferred hosts for
CC production of the recombinant proteins are E. coli, insect cells and
CC yeast cells. The recombinant toxin proteins are used as immunogens for
CC the production of vaccines and antitoxins that are useful in the
CC treatment of humans and animals at risk of intoxication with clostridial
CC toxin. (Updated on 17-OCT-2003 to standardise OS field)
XX
XX Sequence 438 AA;
AAW68389 Length: 438 August 31, 2004 14:39 Type: P Check: 1315 ..
Found using 'seq23' (hayes346.key)
...
26 ESNHLIDLSRYASKINIGKVNFPIDKNQIQLFNLESSKIEVILKNAIVNSMYENFST
76 79
80 83
86 SFWIRIPKVFNSISLNNEVTINCMENNSGKWSVNSYNGIITWLTQTOEIKORVVVKYSQ
104
122
143
146 MINISDIYNRWTFVITNRLNNSKIYINGRLIDQKPISNLGNHASNIMFKLDCGRDT
146
206 HRYIWKYFNLPDKELNEKEIKDLYDNQNSGILKDFWDGLQYDKPVMNLNLYDPNKYV
208 213
246 253
264
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266 -|---|---|
DVNVVGIRGYMYLKGPRGSMVTNTIYLNSSLYRGTKFKFIKKYASGNKONIVRNDRVYIN
267 275 323
326 333
VVVKNKEVRLATNANASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKMKMLQDNN
386 G
...
-----
13 matches found in sequence:
aaw68390 ; Clostridium botulinum toxin A fragment C (His-tagged) .
(from "bt_ags pep")
TOIG of: aaw68390 check: 780 from: 1 to: 462
ID AAW68390 standard; protein; 462 AA.
XX
XX AAW68390;
XX
XX 07-DEC-1998 (first entry)
XX Clostridium botulinum toxin A fragment C (His-tagged) .
XX Antitoxin; vaccine; neurotoxin; toxin A; intoxication; immunogen;
XX botulism.
XX Clostridium botulinum; serotype A.
XX Synthetic.
XX Key Location/Qualifiers
XX FH Peptide 1..21
XX FT /note= "N-terminal histidine tag"
XX WO9808540-A1.
XX 05-MAR-1998.
XX 28-AUG-1997; 97WO-US015394.
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30572, AAV30575.
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 24; Page 265-267; 428pp; English.
XX This is the amino acid sequence of a histidine-tagged fragment C
CC polypeptide of Clostridium botulinum serotype A toxin encoded by a DNA
CC sequence (see AAV30572) in plasmid pHisBot, and by a DNA sequence (see
CC AAV30575) in pHisBota. These vectors were used to express native (i.e.
CC non-fusion) soluble C fragment in Escherichia coli host cells, with the
CC recombinant C fragment being purified on a poly-histidine binding
CC affinity resin. The invention relates to recombinant proteins derived
CC from C. botulinum toxins. Methods are provided which allow the isolation
CC of soluble recombinant proteins that are free of significant endotoxin
CC contamination. Preferred hosts for production of recombinant proteins are
CC E. coli, insect cells and yeast cells. The recombinant toxins are used as
CC immunogens for the production of vaccines and antitoxins that are useful
CC in the treatment of humans and animals at risk of intoxication with
CC clostridial toxin
XX
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640 ENAFETAGASILLFPELLPVVGAFLLESYDNNKNIKTIDNALTNRKNEKWSMYGL
      |--
      697
700 IVAQWLSTVNTQFYTIKEGMYKALNYQAALAEIIKRYNIYSEKESKNINIDFNDINSK
      |--|
      720
760 LNEGQAINNNFNGSCVSYLMKKMPLA
      ...

17 matches found in sequence:
aaw56019 ; Recombinant botulinum neurotoxin type A LH423/A (Q2E,N26K,A27Y).
      (from "bt_ags.pap")
TOIG of: aaw56019 check: 6527 from: 1 to: 871

ID AAW56019 standard; protein; 871 AA.
XX
AC AAW56019;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LH423/A (Q2E,N26K,A27Y).
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX
PI WPI; 1998-169168/15.
DR N-PSDB; AAV26291.
XX
PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 1; Page 108-111; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX

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SQ Sequence 871 AA;
AAW56019 Length: 871 August 31, 2004 14:39 Type: P Check: 6527
Found using 'seq23' (hayes346.key)

1 MQFVNQFNKDPVNGVDIAIKIPNAGQMOPVKAFKIHKKIWIPIPERDFTNPEEGDLN
  |--|
  21 24
61 PPPEAKQVPVSYD
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSPGHEVLNLTNRNGYSGSTQVIRSPDFTF
      |--|
      185
195 GFESLEVDTNPLLGAGKFAFDPAVTLAHLIHAGHRLYGIAINPNRVKVTNAYYEMS
      |--|
      233
255 GLEVSFBEELRTFGHDAKFDISLOENEFRLYYNKKFKDIASLTNKAASIVGTTASLQIMK
      |--|
      287
315 NVFKEKILLSSETSGKFSVDKLFKFKLTKLTYTEDNFVKFKVLNRKTYLNPDKAVF
      |--|
      342
375 KINIVPKVNTIYDGFNLRTNLTAAFNQGNTEINNMMFTKLKNFTGLFEFYKLLCVRGI
      |--|
      384
      387
435 ITSKTSLDKGYKALNDLCIKVNNWDLFFSPSEDNFTDNLKGEITSDTNIEAAEENI
      |--|
      446
495 SLDLIQYYLTFNFDNFPENISLENSSDIIGQLMELMNIERFPNGKKYELDKYTMFHYL
      |--|
      503
555 RAQFEHCKSRIALTNSVNEALLNPSRVYTFESSDYVKKVNKATEAAMFLGWVEQLVYDF
      |--|
      556
615 TDETSEVSTTDKIADITIIPI
...
660 GAVILLEFPEIPAIVLGTFAVSYANKVLTQVTIDNALSQRNEKWDVEVYIVTNWLA
      |--|
      710
720 KVNQTQIDLRKKKEALENQAEATKAIINYQYNOYTEEEKNNINFNIDDLSSKLNESIK
      |--|
      751
780 AMININKFLNQCSVSYLMNSMIPYG
...
-----
13 matches found in sequence:
aaw68389 ; Clostridium botulinum toxin A fragment C.
      (from "bt_ags.pap")
TOIG of: aaw68389 check: 1315 from: 1 to: 438

ID AAW68389 standard; protein; 438 AA.
XX
AC AAW68389;
XX

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197 GFESLEVDNTPLLGAGKATDPAVTLAHLHLHAGHLYGIAINPRVFKVNTNAYYEMS
235
257 GLEVPSEELRTFGHDAKFDLSIQENEFRLYYNKKFKDIASTLNKAKSIVGTTASLQYMK
289
317 NVFKEKILLSSETSGSFSDKLFKDKLYKMLTIYTEDNFVKFKVNLNRKTYLNFDKAVF
344
377 KINIVPKVNYTIYDGFNLRLNLAAMFNGQNTENNMFYKLNFTGLFFYKLLCVRGI
386
437 ITSCKSLDKGYNKALNDLCIKVNNWDLFPSPSEDNFTNDLNKGEISDTNIEAAEENI
448
497 SLDLIOQYLYTFNFDNEPENISIELSSDIIGQLMFPNIERFPNGKVELDKYTFHYL
505
557 RAQEPHGKSRIALTNSVNEALLNPRSVTFPSSDYVKVKVKNKATEAAMFLGWVEQLVYDF
585
617 TDETSEVSTTDKIADITIIPY
...
662 GAVILLEFIPEIAPVLGTFAVSYIANKVLTQTIDNALSKEKNEKWDVEYKVIYNWLA
712
722 KVTQIDLIRKKKEALENOAEATKAIINYQNYTEEKKNINFNIDLSKKNESINK
753
782 AMININKFLNQC SVSYLMNSMIPYG
...
-----
21 matches found in sequence:
aaw56017 ; Recombinant botulinum neurotoxin type B LH728/B.
(from "bt_ags.pep")
TOIG of: aaw56017 check: 8491 from: 1 to: 1169

ID AAW56017 standard; protein; 1169 AA.
XX
AC AAW56017;
AC
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type B LH728/B.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
XX Synthetic.
OS Clostridium botulinum.
XX
XX WO9807864-A1.
XX
PD 26-FEB-1998.
XX
XX 22-AUG-1997; 97WO-GB002273.
XX
XX 23-AUG-1996; 96GB-00017671.
XX
PR 13-DEC-1996; 96GB-00025996.
PR
```

```
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX
DR WPI; 1998-169168/15.
XX N-PSDB; AAV26289.
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 2; Page 91-94; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 1169 AA;
AAW56017 Length: 1169 August 31, 2004 14:39 Type: P Check: 8491
Found using 'seq23' (hayes346.key)
1 MPVTINNPNNDPIDNNNIIMPEPPFARGTGRYKAFKITDRIWIIPERYTYGYPKPEDFN
33 36
34 37
61 KSGGIFNRDVCYYDPDYLTNDKKNI
...
149 ERKKGIFANLIIFGPGVNLNENETIDIGIONHFASREGFGGIMQMKFCPEYVSVFNNVQE
199
209 NKGASIFNRRGVSDPALILMHELHVLHGLYGIKVDLLPIVPNEKKFFMQSTDAIQAE
269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVDRNLKVLVCISDPNININIKNFKDKY
289
329 KFVEDSEGKYSIDVESFDKLYKSLMFGFTETNAENYKIKTRASYSDSLPPVKIKNLLD
331
349
389 NEIYTIIEGFNISDKDMEKEXYRGONKAIKQAYEEISKEHLAVYKIQMCKSVKAPGICID
421
449 VDNEDLFFIADKNPSFDDLSKNERIE
...
520 VYEKQPAIKKIETDENTIFQYLYSQTFPLDIRDISLTSSFDALLFSNKVSYFFSMDYIK
570
```

```

580      TANKVEAGLFAGWVKQIVNDFVIEANKSNMTDKIADISLIVPYIGLALVGNETAQGNF
      |--|
      623
640      ENAFEIAGASILLEFPELLIPVVGAFLESYIDNKNKIITIDNALTNRNEKWSMYGL
      |--|
      697
700      IVAQWLSTVNTQFTYIKEGMYKALNYQAQALEELIKYRYNIYSEKESKNINIDFNDNSK
      |--|
      720
760      LNEGQAIDNINNFINNGSCSVYLMKKMPLA
      |--|
      738
...
838      FDLSTYNTDTILIEFMFNKYNSEILNIIILNRYKDNLLDLSGYGAKVEVVDGVELNDKN
      |--|
      888
898      QFKLTSSANSKIRVTQNIIFNSVFLDFSFWIRIPKYNKDGIQNIHNEYTIINCMK
      |--|
      950
958      NSGWKISIRGNRIIWTLDINGTKTSVFFEYNIREDISEVINRF
      |--|
      1098
...
1008      TNNLNNAKIYINGKLESNTDIKIREVIANGEEIIPKLDGDIRTQFIWMKYFSIFNTELS
      |--|
      1058
1068      QSNTEERYKQSYSEYKDFWGNPLMNYKNEYFMNAGNKNYIKLKKDSPVGEILTRSKY
      |--|
      1080
1128      NQNSKYINRDLTYIGEKEFIIRKNSQSINDDIVRKEDYIYL
      |--|
      1133
      1136
-----
12 matches found in sequence:
aaw56018; Recombinant botulinum neurotoxin type B LH417/B.
(from "bt_ags.pep")
TOIG of: aaw56018 check: 4602 from: 1 to: 858

ID  AAW56018 standard; protein; 858 AA.
XX
AC  AAW56018;
XX
AC  AAW56018;
XX
DT  27-JUL-1998 (first entry)
XX
DE  Recombinant botulinum neurotoxin type B LH417/B.
XX
KW  Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW  detection; tetanus; non-toxic; toxin.
XX
OS  Synthetic.
OS  Clostridium botulinum.
XX
PN  WO9807864-A1.
XX
PD  26-FEB-1998.
XX
XX  22-AUG-1997; 97WO-GB002273.
XX
PR  23-AUG-1996; 96GB-00017671.
PR  13-DEC-1996; 96GB-00025996.
XX
XX  (MTCR-) MICROBIOLOGICAL RES AUTHORITY.
PA  (SPEY-) SPEYWOOD LAB LTD.

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XX      Shone CC, Quinn CP, Foster KA;
PI      WPI; 1998-169168/15.
XX      N-PSDB; AAV26290.
DR      Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
XX      immunogens or as non-toxic standards for the detection of neurotoxins.
PT      Example 2; Page 98-100; 137pp; English.
XX
PS      The present sequence represents a recombinant neurotoxin protein from the
XX      present invention. The present invention describes recombinant neurotoxin
XX      proteins which comprise a first and second domain, where the first domain
XX      is adapted to cleave one or more vesicle or plasma-membrane associated
XX      proteins essential to exocytosis, and where the second domain is adapted:
XX      (a) to translocate the protein into a cell; (b) to increase the
XX      solubility of the protein compared to the solubility of the first domain
XX      on its own, or (c) both to translocate the protein into a cell and to
XX      increase the solubility of the protein compared to the solubility of the
XX      first domain on its own, the protein being free of clostridial neurotoxin
XX      (CN) and free of CN precursor that can be converted into toxin by
XX      proteolytic action. The recombinant proteins can be used as therapeutic
XX      agents for targeting cells expressing a relevant substrate. The products
XX      can also be used as immunogens and as non-toxic standards for the
XX      assessment and development of in vitro assays for the detection of
XX      functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX      environmental samples
XX      Sequence 858 AA;
SQ
AAW56018 Length: 858 August 31, 2004 14:39 Type: P Check: 4602 ..
Found using 'seq23' (hayes346.key)
|--|
|--|
|--|
1  MPVTINNPNVNDPIDNNNIIMMEPPFARGTGRYKAFKAITDRWIIPERYTFGYKPEDFN
   33 36
   34 37
61  KSGIFNRDVCVEYDYPDLVNTNDKNI
...
149  ERKKGIFANLIIFGPGPVLENENETIDIGIQNHFPASREGFGGIMQMKCFEYVSFVNNVQE
      |--|
      199
209  NKGASIFNRRGYFSDPALILMHLELHVHLGLYGIKVDLDPIVPNEKKFFMQSTDAIQAE
      |--|
      289
269  LYTFGGQDPFSIITPSTDKSIYDKVLQNGRIGIVDRLNKVLVCISDENININIKNFKDKY
      |--|
      329
      331
      349
      357
329  KRVDSSEKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSFSDLPVPVKIKNLLD
      |--|
      349
389  NEITYIEGFNISDKMEKEYRGONKAINQAYBEISKEHLAVYKIQMCKSVKAPGICID
      |--|
      421
449  VDNEDLPFIADKNSFSDDLKSKNERIE
...
520  VYEKQPAIKKIFTDNTTFQYLYSQTFPLDIRDISLTSSPDDALLFSNKNVYSFFSMDYIK
      |--|
      570
580  TANKVEAGLFAGWVKQIVNDFVIEANKSNMTDKIADISLIVPYIGLALVGNETAQGNF
      |--|
      623

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DT 15-JUL-2002 (first entry)
 XX Botulinum toxin type A Halla light chain.
 DE
 XX Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
 KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
 KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
 KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
 KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
 KW excessive gastrointestinal secretion; botulinum toxin type A; Halla;
 KW light chain.
 XX
 OS Clostridium botulinum.
 XX
 FH Key Location/Qualifiers
 FT Region 9..12
 FT /label= Tyrosine_motif
 FT Region 20..23
 FT /label= Tyrosine_motif
 FT Region 72..75
 FT /label= Tyrosine_motif
 FT Region 179..182
 FT /label= Tyrosine_motif
 FT Region 286..289
 FT /label= Tyrosine_motif
 FT Region 311..314
 FT /label= Tyrosine_motif
 FT Region 341..344
 FT /label= Tyrosine_motif
 FT Region 365..368
 FT /label= Tyrosine_motif
 FT Region 422..428
 FT /label= Tyrosine_motif
 XX
 PN WO200208268-A2.
 XX
 XX 31-JAN-2002.
 XX
 XX 20-JUL-2001; 2001WO-US023122.
 XX
 XX 21-JUL-2000; 2000US-00620840.
 XX
 XX (ALLR) ALLERGAN SALES INC.
 XX
 XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX
 XX WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters
 PT the biological persistence and/or biological activity of a neurotoxin,
 PT useful for treating neuromuscular or autonomic disorder, or pain.
 XX
 PS Example 14; Fig 3; 102pp; English.
 XX
 CC The sequence represents the botulinum toxin type A Halla light chain. The
 CC invention relates to a novel modified neurotoxin including a structural
 CC modification, where the structural modification is effective to alter the
 CC biological persistence, or biological activity. The modified neurotoxin
 CC is useful for treating spasmodic dysphonia, laryngeal dystonia,
 CC oromandibular dysphonia, lingual dystonia, cervical dystonia, focal hand
 CC dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid disorder,
 CC cerebral palsy, focal spasticity, spasmodic colitis, neurogenic bladder,
 CC anismus, limb spasticity, tics, tremors, bruxism, anal fissure,
 CC achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation,
 CC excessive gastrointestinal secretions, pain from muscle spasms, headache
 CC pain, brow furrows or skin wrinkles
 XX
 SQ Sequence 437 AA;
 XX
 AB80653 Length: 437 August 31, 2004 14:39 Type: P Check: 6765 ..
 Found using 'seq23' (hayes346.key)
 --|

1 PFVNKQFNKDPVNGVDIAYIKIPNVGQMOPVKAFKIHNKIWIPERDFTTNPEEGDLP
 20 23
 61 PPEAKQPVSVYYD
 ...
 134 INVIQDGSYRSEELNLVIIGFSADIQPECKSFGEVNLNLTNGYGSQYIRFSPDFTF
 184
 194 GFESLEVDTNPLLGAGKATDPANTLAHELHAGHRLYGIAINPNRVKVNNTNAYEVS
 232
 254 GLEVSFEELRTFGHDAKFIDSLQENEPRLYYNKNFKDIASTLNKAKSIVGTTASIQYMK
 286
 314 NVFKKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVFKFKVNLNKTLYINFDKAVF
 341
 374 KINIVPKVNYTIYDGFNLNLTNLAANFNGQNTNINNMNFTKLKNFTGLPEFYKLLCVRGI
 383 386
 434 ITSK

 7 matches found in sequence:
 abb80654 ; Botulinum toxin type B Danish I light chain.
 (from "bt_ags.pep")
 TOIG of: abb80654 check: 9222 from: 1 to: 441
 ID ABB80654 standard; peptide; 441 AA.
 XX
 AC ABB80654;
 XX
 DT 15-JUL-2002 (first entry)
 XX
 DE Botulinum toxin type B Danish I light chain.
 XX
 KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
 KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
 KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
 KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
 KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
 KW excessive gastrointestinal secretion; botulinum toxin type B; Danish I;
 KW light chain.
 XX
 OS Clostridium botulinum.
 XX
 PN WO200208268-A2.
 XX
 XX 31-JAN-2002.
 XX
 XX 20-JUL-2001; 2001WO-US023122.
 XX
 XX 21-JUL-2000; 2000US-00620840.
 XX
 XX (ALLR) ALLERGAN SALES INC.
 XX
 XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
 XX
 XX WPI; 2002-241566/29.
 XX
 XX Novel modified neurotoxin comprising structural modification which alters
 PT the biological persistence and/or biological activity of a neurotoxin,
 PT useful for treating neuromuscular or autonomic disorder, or pain.
 XX

KW Botulinum neurotoxin type D; BoNT; botulism; non-toxic; vaccine; poison; protect.

XX OS Clostridium botulinum.

XX PN WO200005252-A1.

XX PD 03-FEB-2000.

XX PF 20-JUL-1999; 99WO-IB001301.

XX PR 22-JUL-1998; 98ZA-00006538.

XX PA (AGRI-) AGRIC RES COUNCIL.

XX PI De Bruyn EE, Botha AD;

XX WPI; 2000-205375/18.

XX N-PSDB; AAZ98630, AAZ98631.

XX Non-toxic immunogenic derivative of Clostridium botulinum neurotoxin type D, useful in vaccines for protection against botulism, comprises at least one amino acid mutation not present in the wild type D neurotoxins.

XX Claim 3, 4; Page 54-57; 66pp; English.

XX This sequence represents the amino acid sequence of a synthetic non-toxic immunogenic derivative of Clostridium botulinum type D toxin (BoNT).

XX Botulinum neurotoxin causes botulism poisoning in cattle and sheep, and usually results in the death of the affected or poisoned animal. The non-toxic immunogenic fragments of the C. botulinum neurotoxin are useful in vaccines to protect animals (e.g. humans, cattle, sheep, pigs) against BoNT type D poisoning. The non-toxic fragments can be produced relatively simply and inexpensively (specifically by fermentation techniques). As the fragments are not toxic the risk to production staff is reduced

XX Sequence 399 AA;

AAV78982 Length: 399 August 31, 2004 14:39 Type: P Check: 2461 ..

Found using 'seq23' (hayes346.key)

1 AEVFEVGNVQLNPIFPDFKLGSSDGRGLIVTQENIVVNAVYESFSISFWIRINKWV 41 44 45 48

61 SNLPGYTIIDSVKNSGWSIGIISNFIIVFTLQENISEQDINFSDISKNAAGYNKWFV 66 69

121 TITNMGMNMIYINGKLIDTIKVKELTGINFSTITFQMKIPNTGLITSDSDNINWVI 114

181 RDFYIFAKELDDKDINILFNSLQVNTVVKDYWGNDLRYDKYVIMVNNYNNRYSKKGNG 184 204 222

241 IVFTRKNNDNFNGYKTIIRKIRGNTNDTRVRGHNVLVFNNTIDNKQYSLGMYKPSRNL 256

301 GTDLVPLGALDQPMDEIRKYSFIQPCNTFDYASQLFLSSNATTNELGISYSYFK 320

361 LGDDYWFNHEYLIPVKIKIEHYASLLESTSTHWVFVPAE 381

1 match found in sequence:
abb80641 ; Clostridium botulinum toxin type A leucine based motif.
(from "bt_ags.pep")

TOIG of: abb80641 check: 2137 from: 1 to: 7

ID ABB80641 standard; peptide; 7 AA.

XX ABB80641;

XX AC

XX DT 15-JUL-2002 (first entry)

XX DE Clostridium botulinum botulinum toxin type A leucine based motif.

XX KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm; dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation; eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis; neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism; anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache; excessive gastrointestinal secretion; leucine-based motif; botulinum.

XX OS Clostridium botulinum.

XX PN WO200208268-A2.

XX PD 31-JAN-2002.

XX PF 20-JUL-2001; 2001WO-US023122.

XX PR 21-JUL-2000; 2000US-00620840.

XX PA (ALLR) ALLERGAN SALES INC.

XX PI Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX DR WPI; 2002-241566/29.

XX Novel modified neurotoxin comprising structural modification which alters the biological persistence and/or biological activity of a neurotoxin, useful for treating neuromuscular or autonomic disorder, or pain.

XX Claim 28; Page 76; 102pp; English.

XX The sequence represents a leucine based motif from Clostridium botulinum, botulinum toxin type A, which may act as a biological persistence enhancing component in a neurotoxin. The invention relates to a novel modified neurotoxin including a structural modification, where the structural modification is effective to alter the biological persistence, or biological activity. The modified neurotoxin is useful for treating or spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia, cervical dystonia, focal hand dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics, tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation, excessive gastrointestinal secretions, pain from muscle spasms, headache pain, brow furrows or skin wrinkles

XX Sequence 7 AA;

ABB80641 Length: 7 August 31, 2004 14:39 Type: P Check: 2137 ..

Found using 'seq23' (hayes346.key)

1 FEFVKLL 4 7

10 matches found in sequence:
abb80653 ; Botulinum toxin type A HallA light chain.
(from "bt_ags.pep")
TOIG of: abb80653 check: 6765 from: 1 to: 437

ID ABB80653 standard; peptide; 437 AA.

XX ABB80653;

XX AC

XX

1 PFVNKQFNKYKDPVNGVDIAVIKIPNVGQMPPVKAFKIHNKIWIPIPERDTFTINPEGLNP
20 23

61 PPEAKQVPVSYYD

...

134 INVIQPDGSYRSEELNLVIIGPSADIIQPECKSFGEHVLNLTNRNGYGSTQVIRFSPDPTF
184

194 GFESLEVDTNPLLGAGKEATDPAVTLAHELIHAGHRLYGIAINPNRVFKVNTNAVYEMS
232 249

254 GLEVFSFEELRTFGHDAKFDISLOENEFRLYYNNKFKDIASTLNKAKSIVGTWTASLQYMK
286

314 NVFKEKYLLEDTSCKFSVDKLKFDKLYKMFLFIETEDNFVKFKVLNRKTYLANFDKAVF
341 365

374 KNIIVPKVNYTIIYDGFNLRNTNLAAFNFGONTENNMTKLKNFTCLGFEPFYKACVRGI
383 386 425

434 ITSK

1 match found in sequence:
abb80663 ; Wildtype botulinum toxin type A light chain C-terminal region.
(from "bt_ags.pep")
TOIG of: abb80663 check: 8911 from: 1 to: 27

ID AB880663 standard; peptide; 27 AA.

AC AB880663;

XX XX

DT 15-JUL-2002 (first entry)

DE XX

KW Wildtype botulinum toxin type A light chain C-terminal region.

KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;
KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;
KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;
KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;
KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;
KW excessive gastrointestinal secretion; botulinum toxin type A; C-terminus.

OS Clostridium botulinum.

XX WO200208268-A2.

FN 31-JAN-2002.

PD 20-JUL-2001; 2001WO-US023122.

Pf 21-JUL-2000; 2000US-00620840.

PR (ALLR) ALLERGAN SALES INC.

XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
XX WPI; 2002-241566/29.

DR Novel modified neurotoxin comprising structural modification which alters
XX the biological persistence and/or biological activity of a neurotoxin,
PT useful for treating neuromuscular or autonomic disorder, or pain.
XX Example 15; Fig 10; 102pp; English.

PS Disclosure; Fig 8; 102pp; English.

XX The sequence represents the botulinum toxin type B Danish I light chain.

CC The invention relates to a novel modified neurotoxin including a

CC structural modification, where the structural modification is effective

CC to alter the biological persistence, or biological activity. The modified

CC neurotoxin is useful for treating spasmodic dysphonia, laryngeal

CC dystonia, oromandibular dysphonia, lingual dystonia, cervical dystonia,

CC focal hand dystonia, blepharospasm, strabismus, hemifacial spasm, eyelid

CC disorder, cerebral palsy, focal spasticity, spasmodic colitis, neurogenic

CC bladder, anismus, limb spasticity, tics, tremors, bruxism, anal fissure,

CC achalasia, dysphagia, lacrimation, hyperhidrosis, excessive salivation,

CC excessive gastrointestinal secretions, pain from muscle spasms, headache

CC pain, brow furrows or skin wrinkles

XX

SQ Sequence 441 AA;

ABB0654 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..

Found using 'seq23' (hayes346.key)

1 MPVTINNENVPIDNNIIMPEPPFARGTGRYKAFKITDRWIIPERYTFGYKPEDFN
33 36
34 37

61 KSGIFNRDVCYDDPYLNTNDKNI

....

149 ERKKGIFANLIFGPGPVINENETIDIGIQNHASREGFGGIMQKFCPEXVSFNNVQE
199

209 NKGASIFNRGYFSDPALILMHELHVLHGLYGIKVDLPIVPNEKKPFMOSTDAIQAE
289

269 LYTFGGQPSIITSTDKSIYDKVLQFRGIVDLRLKVLVCISDENININIKNFEDKY
328

329 KFVEDSEKYSIDVSEFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKNLLD
331

389 NEITYIERGFNISDKMEKEYRGQNKAINKQAYEIEISKEHLAVYKIOMCKSVK
421

9 matches found in sequence:

abb80655 ; Botulinum toxin type A Halla light chain dell-8/416-437 mutant.
(from "bt.ags.pep")

TOIG of: abb80655 check: 2399 from: 1 to: 407

ID ABB80655 standard; peptide; 407 AA.

XX

AC ABB80655;

XX

DT 15-JUL-2002 (first entry)

XX

DE Botulinum toxin type A Halla light chain dell-8/416-437 mutant.

XX

KW Neurotoxin; biological persistence; dysphonia; strabismus; muscle spasm;

KW dystonia; pain; blepharospasm; hemifacial spasm; excessive salivation;

KW eyelid disorder; cerebral palsy; focal spasticity; spasmodic colitis;

KW neurogenic bladder; anismus; limb spasticity; tic; tremor; bruxism;

KW anal fissure; achalasia; dysphagia; lacrimation; hyperhidrosis; headache;

KW excessive gastrointestinal secretion; botulinum toxin type A; Halla;

KW light chain.

XX

OS Clostridium botulinum.

OS Synthetic.

XX

PN WO200208268-A2.

XX

PD 31-JAN-2002.

XX

PF 20-JUL-2001; 2001WO-US023122.

XX

PR 21-JUL-2000; 2000US-00620840.

XX

PA (ALLR) ALLERGAN SALES INC.

XX

PI Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX

DR WPI; 2002-241566/29.

XX

PT Novel modified neurotoxin comprising structural modification which alters

ET the biological persistence and/or biological activity of a neurotoxin,

PT useful for treating neuromuscular or autonomic disorder, or pain.

XX

PS Example 15; Page; 102pp; English.

XX

CC The sequence represents a mutant of the botulinum toxin type A Halla

CC light chain, in which the 8 amino acids at the N-terminus and 22 amino

CC acids at the C-terminus have been deleted. The invention relates to a

CC novel modified neurotoxin including a structural modification, where the

CC structural modification is effective to alter the biological persistence,

CC or biological activity. The modified neurotoxin is useful for treating

CC spasmodic dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual

CC dystonia, cervical dystonia, focal hand dystonia, blepharospasm,

CC strabismus, hemifacial spasm, eyelid disorder, cerebral palsy, focal

CC spasticity, spasmodic colitis, neurogenic bladder, anismus, limb

CC lacrimation, hyperhidrosis, excessive salivation, excessive

CC gastrointestinal secretions, pain from muscle spasms, headache pain, brow

CC furrows or skin wrinkles. Note: The present sequence is not shown in the

CC specification but is derived from the sequence information given in

CC Figure 3 and on page 69

XX

SQ Sequence 407 AA;

ABB0655 Length: 407 August 31, 2004 14:39 Type: P Check: 2399 ..

Found using 'seq23' (hayes346.key)

1 YKDPVNGVDIAYIKIPNVGQMPQKAFKIHKNKIWIPERDFTNPEEGDLNPPPEAKQVP
12 15

61 VSYID

...

126 INVIQDGSYRSEELNLVIIGPSADIIQFECKSGHEVLNLTNGYGSQYIRFSPDFTF
176

186 GFESLEVDTNFLGAGKFAIDPAVTLAHELHAGHRLYGIINPNRNVKVTNAYEKS
224

246 GLEVSFEELRTFGGHDAKFIDSLQENEFLLYNNKFKDIASINLAKSIVGTASIQYMK
278

306 NVFKKYLSEDTSGKFSVDKLFKDKLYKMLTEIVTDNFKVFKVNLNRTYLNFDKAVF
333

366 KINIVPKVNTYTDGFNLRNTNLNANFNQNTNINNMNFTKL
375 378

```

CC terminus, and a cysteine, serine or threonine at its N-terminus, and a
CC nucleophilic reagent able to cause cleavage of the intein to form a
CC peptide bond between the extein C-terminus and synthetic peptide N-
CC terminus through the formation of an activated ester or thio ester
CC intermediate. (I) has antiinflammatory activity and prevents accumulation
CC of pancreatic digestive enzymes, and prevents exocytic fusion of vesicles
CC containing secretory enzymes of pancreas. (I) is useful for treating
CC acute pancreatitis. The present sequence represents the Clostridium
CC botulinum BoNT/A neurotoxin light chain prototoxin which is given in the
XX exemplification of the present invention
SQ Sequence 448 AA;

AAB24387 Length: 448 August 31, 2004 14:39 Type: P Check: 3349 ..
Found using 'seq23' (hayes346.key)

1 MPFVNQFNYKDPVNGVDIAYIKIPNAGQMPPVKAFKIHNIWVPERDFTTNPBGDLN
21 24
61 PPEAKQVPVSYD
...
135 INVIQDGSYRSEELNLVIIGPSADIIQPECKSFGEVNLTRNGYGTQYIRFSPDFTF
185
195 GFESLEVDNPLLGAGKEATDPAVTLAHLIHAGHRLYGIALNPNRVKNTNAYEYS
233
255 GLEVSFEELRTGGHDAKFDLSQENEFRLYYNKFQDIASTLNKAKSIVGTTASLQYMK
287
315 NVFKEKYLSEDTSGKFSVDKLFKDLKYLKMLTEIYTEDNFVKEFKVLNKRKTYLNFDAKVF
342
375 KINIVPKVNTYIDGPNLRNTNLAAFNQONTNINNNFTKLKNFTGLPEFYKLLCVRG
384 387
435 ITSQKSLDKGYNK

-----
6 matches found in sequence:
aab36302 ; C. botulinum BoNT/A neurotoxin heavy chain prototoxin SEQ ID NO:8.
TOIG of: aab36302 check: 5385 from: 1 to: 423

ID AAB36302 standard; protein; 423 AA.
XX
AC AAB36302;
XX
DT 15-FEB-2001 (first entry)
XX
DE C. botulinum BoNT/A neurotoxin heavy chain prototoxin SEQ ID NO:8.
XX
KW Human; procholecystokinin; CCK A receptor; CCK B receptor; pancreatitis;
KW antiinflammatory.
XX
OS Clostridium botulinum.
XX
PN WO2000061192-A2.
XX
PD 19-OCT-2000.
XX
PF 06-APR-2000; 2000WO-US0009142.
XX

```

```

PR
XX
PA (ALLR ) ALLERGAN SALES INC.
XX
PI Steward LE, Sachs G, Aoki KR;
XX
DR WPI; 2000-679416/86.
XX
PT New composition for treating acute pancreatitis, comprises a pancreatic
PT cell surface marker binding element, a translocation element that
PT transfers polypeptide across vesicular membrane, and a therapeutic
PT element.
XX
PS Disclosure; Page 28; 50pp; English.
XX
CC The present invention describes a composition (I) for treating acute
CC pancreatitis. (I) comprises a first element containing a binding element
CC that binds to a pancreatic cell surface marker, a second element
CC containing a translocation element that facilitates polypeptide transfer
CC across the vesicular membrane, and a third element containing a
CC therapeutic element that inhibits enzyme secretion in pancreatic cell
CC cytoplasm. Also described is a method for making a therapeutic cell
CC polypeptide having a binding element selective for cholecystokinin (CCK)
CC receptor by expressing within a host cell a recombinant chimeric
CC polypeptide comprising an extein containing a therapeutic element and a
CC translocational element, and an intein located to the carboxy terminal of
CC extein having a cysteine, serine or threonine at its amino terminus, and
CC contacting the extein with a synthetic peptide comprising a CCK amino
CC acid sequence containing an amidated phenylalanine at a natural C-
CC terminus and a cysteine, serine or threonine at its N-terminus, and a
CC nucleophilic reagent able to cause cleavage of the intein to form a
CC peptide bond between the extein C-terminus and synthetic peptide N-
CC terminus through the formation of an activated ester or thio ester
CC intermediate. (I) has antiinflammatory activity and prevents accumulation
CC of pancreatic digestive enzymes, and prevents exocytic fusion of vesicles
CC containing secretory enzymes of pancreas. (I) is useful for treating
CC acute pancreatitis. The present sequence represents the Clostridium
CC botulinum BoNT/A neurotoxin heavy chain prototoxin which is given in the
XX exemplification of the present invention
SQ Sequence 423 AA;

AAB36302 Length: 423 August 31, 2004 14:39 Type: P Check: 5385 ..
Found using 'seq23' (hayes346.key)

...
5 LCIKVNNWDLFFSPSDNFTNDLNKGEEITSDTNTIEAABENISLDLIQYYITFNFDPNP
55 58
65 ENISIENTLSSDIIGLELMPNTERFPNGKKYELDKYTMFHYLRQAQFEHGHKSRIALNTSV
100 105
125 NEALLNPGRVYTFSSDYVKVKNKATEAAMFLGWVEQLVYDFTDETSEVSTTDKIADITI
135
185 IIPY
...
212 GAVILLEFIPEIPIVLGTFALVSYIANKVLTVQIDNLSKRNKNEKWEVYKVIYNWLA
262
272 KVNTQIDLRKKWKEALENQAEATKAILNYQVNTYEBEKNNINFNIDDLSSKLNESINK
303
332 AMININKFLNQCSVSYLNMNMIPIYG

```


AC AAB04096;
 XX DT 11-APR-2001 (first entry)
 XX
 DE Botulism toxin heavy chain C-terminal sequence (serotype F).
 XX
 DE Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 KW infection.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 PN WO200067700-A2.
 XX
 PD 16-NOV-2000.
 XX
 PF 12-MAY-2000; 2000WO-US012890.
 XX
 PR 12-MAY-1999; 99US-0133865P.
 PR 12-MAY-1999; 99US-0133866P.
 PR 12-MAY-1999; 99US-0133867P.
 PR 12-MAY-1999; 99US-0133868P.
 PR 12-MAY-1999; 99US-0133869P.
 PR 12-MAY-1999; 99US-0133873P.
 PR 29-JUL-1999; 99US-0146192P.
 XX
 PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX
 PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
 XX
 DR WPI; 2001-016048/02.
 DR N-PSDB; AAA54490.
 XX
 PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
 PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 PT against botulism.
 XX
 PS Claim 3; Fig 9b; 73pp; English.
 XX
 CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 CC and then posttranslationally nicked, forming a dichain consisting of a
 CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
 CC can be used in recombinant expression vectors and expressed in
 CC transformed cells to produce peptide antigens useful for eliciting an
 CC immune response to give protective immunity against botulinum neurotoxin,
 CC which causes botulism. The nucleic acids are expressible in a recombinant
 CC organisms such as Escherichia coli or Pichia pastoris. The use of
 CC recombinant nucleic acids are advantageous since it eliminates the need
 CC to culture large quantities of hazardous toxin-producing bacterium.
 CC Production yield from the genetically engineered product is also high and
 CC cost of production is lower. The nucleic acids can be derived from
 CC Clostridium botulinum serotypes A-G
 XX
 SQ Sequence 432 AA;
 AAB04096 Length: 432 August 31, 2004 14:39 Type: P Check: 8175
 Found using 'seq23' (hayes346.key)

1 MSYTDNKILLYFNKLYKKIKDINSILDMRYENKPFIDISGYGSNISGNDVYIYSTNRNQ
 17 20

61 FGIYSKPEVNAQNNDIYNGRYQNFISFPWRIPKYFNKVNLNNEYTIIDCIRNNNS
 85 88

121 GWKISLNTKILWTLODTAGNNQKLVFNFTQMSISDYINKWIFVTTNRLGNRIYIN
 128 149

181 GNLIDEKSISNLGDIHVSDNLIKIVGCDTRYGVGIRPKVFDTELKTEIETLYSDEPD
 213 218
 241 PSILKDFWGNLYLLYKRYVLLNLLRLTRDKSITONSFLNINQORGVYQKKNIFSNTFLYTG
 251 258
 301 VEVIIKNGSTDISNTDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIKLIKRTSNS
 327 337 340
 361 NNSLGQIIVMDSIGNCTMNFQNNNGNIGLLGFHSHNLLVASSWYNNIRKNTSSNGCFW
 406
 421 SFISKEHGWQEN

 5 matches found in sequence:
 aab04097 : Botulism toxin heavy chain N-terminal sequence (serotype B).
 (from "bt_ags.pep")
 TOIG of: aab04097 check: 8861 from: 1 to: 413
 ID AAB04097 standard; protein; 413 AA.
 XX
 AC AAB04097;
 XX
 DT 11-APR-2001 (first entry)
 XX
 DE Botulism toxin heavy chain N-terminal sequence (serotype B).
 XX
 KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
 KW recombinant vector; antigen; immune response; vaccine; bacterium;
 KW infection.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 PN WO200067700-A2.
 XX
 PD 16-NOV-2000.
 XX
 PF 12-MAY-2000; 2000WO-US012890.
 XX
 PR 12-MAY-1999; 99US-0133865P.
 PR 12-MAY-1999; 99US-0133866P.
 PR 12-MAY-1999; 99US-0133867P.
 PR 12-MAY-1999; 99US-0133868P.
 PR 12-MAY-1999; 99US-0133869P.
 PR 12-MAY-1999; 99US-0133873P.
 PR 29-JUL-1999; 99US-0146192P.
 XX
 PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX
 PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
 XX
 DR WPI; 2001-016048/02.
 DR N-PSDB; AAA54493.
 XX
 PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
 PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
 PT against botulism.
 XX
 PS Claim 6; Fig 12b; 73pp; English.
 XX
 CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
 CC and then posttranslationally nicked, forming a dichain consisting of a
 CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
 CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
 CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)

CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G

XX Sequence 449 AA;

AA04094 Length: 449 August 31, 2004 14:39 Type: P Check: 2298 ..
Found using 'seq23' (hayes346.key)

...

52 MRYKNDKYVDTSGVDSNININGDVVYPTKNQFGIYNDKLTNELNSQNDYIIYDNKYKN
102 109

112 FSISFWVRIPYDNKIVVNVEYTIICMRDNNSGWKVSLAHNEIITWLDQNAGINOKLA
112 134

172 FNYGNANGISDYINKWIFVTITNDRLGDSKLYINGNLIDQKSILNLGNIHVSDNLFKIV
174

232 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNEPNTNLIKDFWGNVLLYDKKEYLLNLVKLP
235 243 276 283

292 NNFIDRRKDSLTSLINNIRSTILLANRLYSIGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
319 346

352 SKTHLFLPYADTATTNKEKTIKISSGNRFNQVVMNSVGNCTNMFKNNGNNGNIGLLGF

412 KADTVVASTWYVYTHMRDHTNSNGCFWNFISEHGWOEK
423

12 matches found in sequence:
aab04095 ; Botulism toxin heavy chain C-terminal sequence (serotype E).
(from "bt ags.pep")
TOIG of: aab04095 check: 8672 from: 1 to: 419

ID AAB04095 standard; protein; 419 AA.

XX AC AAB04095;

XX AC AAB04095;

DT 11-APR-2001 (first entry)

XX Botulism toxin heavy chain C-terminal sequence (serotype E).
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.

XX Synthetic.

OS Clostridium botulinum.

XX WO2000067700-A2.

XX 16-NOV-2000.

PF 12-MAY-2000; 2000WO-US012890.

XX 12-MAY-1999; 99US-0133865P.

PR 12-MAY-1999; 99US-0133866P.

PR 12-MAY-1999; 99US-0133867P.

PR 12-MAY-1999; 99US-0133868P.

PR 12-MAY-1999; 99US-0133869P.

PR 12-MAY-1999; 99US-0133870P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;

WPI; 2001-016048/02.

N-PSDB; AAA54489.

New nucleic acids encoding the carboxy- or amino-terminal portions of the
heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
against botulism.

Disclosure; Fig 8; 73pp; English.

Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
and then posttranslationally nicked, forming a dichain consisting of a
100 kDa heavy chain and a 50 kDa light chain which remain linked by a
disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BONT)
can be used in recombinant expression vectors and expressed in
transformed cells to produce peptide antigens useful for eliciting an
immune response to give protective immunity against botulinum neurotoxin,
which causes botulism. The nucleic acids are expressible in a recombinant
organism such as Escherichia coli or Pichia pastoris. The use of
recombinant nucleic acids are advantageous since it eliminates the need
to culture large quantities of hazardous toxin-producing bacterium.
Production yield from the genetically engineered product is also high and
cost of production is lower. The nucleic acids can be derived from
Clostridium botulinum serotypes A-G

Sequence 419 AA;

AA04095 Length: 419 August 31, 2004 14:39 Type: P Check: 8672 ..
Found using 'seq23' (hayes346.key)

...

22 MRYKNDKYVDTSGVDSNININGDVVYPTKNQFGIYNDKLTNELNSQNDYIIYDNKYKN
72 75 79

82 FSISFWVRIPYDNKIVVNVEYTIICMRDNNSGWKVSLAHNEIITWLDQNAGINOKLA
82 104

142 FNYGNANGISDYINKWIFVTITNDRLGDSKLYINGNLIDQKSILNLGNIHVSDNLFKIV
144

202 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNEPNTNLIKDFWGNVLLYDKKEYLLNLVKLP
205 213 246 253

262 NNFIDRRKDSLTSLINNIRSTILLANRLYSIGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
289 316

322 SKTHLFLPYADTATTNKEKTIKISSGNRFNQVVMNSVGNCTNMFKNNGNNGNIGLLGF

382 KADTVVASTWYVYTHMRDHTNSNGCFWNFISEHGWOEK
393

14 matches found in sequence:

aab04096 ; Botulism toxin heavy chain C-terminal sequence (serotype F).
(from "bt ags.pep")

TOIG of: aab04096 check: 8175 from: 1 to: 432

ID AAB04096 standard; protein; 432 AA.

XX

OS Synthetic.
 XX WO200002524-A2.
 PN
 XX
 PD
 XX
 PF
 XX
 XX 09-JUL-1999; 99WO-US015570.
 XX
 PR 10-JUL-1998; 98US-0092416P.
 PR 12-MAY-1999; 99US-0133870P.
 XX
 XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
 XX
 XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
 PI WPI; 2000-160827/14.
 XX N-PSDB; AAZ87213.
 DR
 DR
 XX
 XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
 PT toxin serotypes A-G, is used for inducing an immune response against
 PT botulinum.
 XX
 PS Claim 23; Page; 54pp; English.
 XX
 CC The invention relates to novel vaccines that induce a protective immune
 CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
 CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
 CC DNA construct comprising a vector, and at least one nucleic acid fragment
 CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
 CC G. In preferred embodiments of the invention, the vector is a Venezuelan
 CC equine encephalitis virus (VEE) replicon vector. Use of this vector
 CC results in the production of large amounts of a protein encoded by a
 CC sequence cloned into the replicon. The constructs are used to produce
 CC vaccines against botulinism. The proteins can also be used as diagnostic
 CC tools for the diagnosis of botulinism. The transformed host cells can be
 CC used to analyse the effectiveness of drugs and agents which inhibit toxin
 CC effects. The vaccine currently used against botulinism is dangerous and
 CC expensive to produce, and contains formalin, which is very painful for
 CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
 CC serotypes are represented in the formulation. The novel vaccine of
 CC overcomes these problems, as it is easily purified, and available in
 CC large quantities. It is also expressed in the lymph nodes for a better
 CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
 CC fragments used in the present invention. The DNA encoding these sequences
 CC had been optimised for codon usage for expression in yeast. Note: This
 CC sequence is not given in the specification, but is decoded from the BoNTB
 CC Hc DNA sequence given on pages 39-40
 XX
 SQ Sequence 440 AA;
 AAY77135 Length: 440 August 31, 2004 14:39 Type: P Check: 6014
 Found using 'seq23' (hayes346.key)
 1 MANKYNSEILANNIILNRYKNNLIDLSYGAKVEYDGVGLNDKNQFKLTSSANSKIRV
 37 40
 61 TONQNIIFNSVELDFSVFWIRIPKYNKDGIONYIHNEYTIINCMKNNSGWKISIRGNRI
 99 102
 121 IWTLLIDNGKTSVFFVEYNIREIDSEYINRW
 ...
 157 TNNLNNAKIYINGKLESNTDIKDIREVIANGELIIFKLDGIDRTQFIWMKYPSIFNTELS
 207
 217 QSNIEERYKIQSYELKDFWGNPLMYNKYTFMFGNKNKNSYIKLKDKSPVGEILTRSKY
 229 258

277 NQNSKYINRYDLVIGEKFTIRKNSQSINDDIVRKEDYIYLDFFNLQBWRYVTKYKF
 282 315 332
 285
 337 KEEKLFLAPISDSDELNTIQIKEYDEQTYSCQLLFKKDEESTDEIGLIGIHRFYEG
 354
 397 IVFEYKDYFCISKWYLVKVKRKPYNLKLGCNWNQFIPKDEGWTE
 402 405

 13 matches found in sequence:
 aay77136 ; Synthetic botulinum neurotoxin serotype C (BoNTC) C-terminal fragment
 (from "bt_ags.pep")
 TOIG of: aay77136 check: 8215 from: 1 to: 450
 ID AAY77136 standard; protein; 450 AA.
 XX
 AC AAY77136;
 XX
 DT 08-MAY-2000 (first entry)
 XX
 DE Synthetic botulinum neurotoxin serotype C (BoNTC) C-terminal fragment.
 XX
 KW Botulinum neurotoxin; heavy chain; BoNT; serotype C; C-terminal fragment;
 KW Venezuelan equine encephalitis virus replicon; VEE; botulinism; vaccine;
 XX diagnosis; drug screening.
 XX
 OS Clostridium botulinum.
 OS Synthetic.
 XX
 PN WO200002524-A2.
 XX
 PD 20-JAN-2000.
 XX
 PF 09-JUL-1999; 99WO-US015570.
 XX
 PR 10-JUL-1998; 98US-0092416P.
 PR 12-MAY-1999; 99US-0133870P.
 XX
 PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
 XX
 XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
 XX WPI; 2000-160827/14.
 DR N-PSDB; AAZ87214.
 XX
 PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
 PT toxin serotypes A-G, is used for inducing an immune response against
 PT botulinum.
 XX
 PS Claim 24; Page 41-42; 54pp; English.
 XX
 CC The invention relates to novel vaccines that induce a protective immune
 CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
 CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
 CC DNA construct comprising a vector, and at least one nucleic acid fragment
 CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
 CC G. In preferred embodiments of the invention, the vector is a Venezuelan
 CC equine encephalitis virus (VEE) replicon vector. Use of this vector
 CC results in the production of large amounts of a protein encoded by a
 CC sequence cloned into the replicon. The constructs are used to produce
 CC vaccines against botulinism. The proteins can also be used as diagnostic
 CC tools for the diagnosis of botulinism. The transformed host cells can be
 CC used to analyse the effectiveness of drugs and agents which inhibit toxin
 CC effects. The vaccine currently used against botulinism is dangerous and
 CC expensive to produce, and contains formalin, which is very painful for

```
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rfab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rfabs
XX
SQ Sequence 254 AA;
AAV30123 Length: 254 August 31, 2004 14:39 Type: P Check: 7711 ..
Found using 'seq23' (hayes346.key)
...
66 GLEWIGRIDPANGTEYDKPQKATITADTSSNTVNLQLSLTSEDVAVYVCASGGELG
116
126 FPYWGQGLTVTSAAKTTTPSPVPLAPGSAQAQTNMVTGLCLVRKGYFPEPVTVTWNSGSL
148
186 SSGVHTFPVQLQSDLY
...
-----
13 matches found in sequence:
aay77134 ; Synthetic botulinum neurotoxin serotype A (BoNTA) C-terminal fragment
(from "bt_ags.pep")
TOIG of: aay77134 check: 1315 from: 1 to: 438
ID AAY77134 standard; protein; 438 AA.
XX
AC AAY77134;
XX
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype A (BoNTA) C-terminal fragment.
XX
KW Botulinum neurotoxin; heavy chain; BoNT; serotype A; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX
OS Clostridium botulinum.
OS Synthetic.
XX
PN WO200002524-A2.
XX
PD 20-JAN-2000.
XX
PF 09-JUL-1999; 99WO-US015570.
XX
PR 10-JUL-1998; 98US-0092416P.
PR 12-MAY-1999; 99US-0133870P.
XX
PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX
XX WPI; 2000-160827/14.
XX
DR N-PSDB; AAZ87212.
XX
PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
PT toxin serotypes A-G, is used for inducing an immune response against
PT botulinum.
XX
PS Claim 22; Page 54; 54pp; English.
XX
CC The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
```

```
CC In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast
XX
SQ Sequence 438 AA;
AAV77134 Length: 438 August 31, 2004 14:39 Type: P Check: 1315 ..
Found using 'seq23' (hayes346.key)
...
26 ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVLKNAIVNSMYNEFST
76 79 80 83
86 SFWIRIPKYFNSISLNNEYTIINCWMENNSGWKVSINYGELIWTQLDQTQEIQRVVFYKYSQ
104 122 143
146 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKIPISNLGNHASNNIMFKLDGCRDT
146
206 HRYWIKYFNLFDKELNEKEIKDLYDNQNSGILKDFWGDYLOYDKPYVYMLNLYDPNKYV
208 213 246 253 264
266 DVNNVGIRGYMYLKGPRGSVMTTIYILNSLSYRGTKFTIKKYASGNKDNIVRNNDRVTIN
267 275 323
326 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNKCKMNLQNN
326 333
386 G
..
-----
14 matches found in sequence:
aay77135 ; Synthetic botulinum neurotoxin serotype B (BoNTB) C-terminal fragme
(from "bt_ags.pep")
TOIG of: aay77135 check: 6014 from: 1 to: 440
ID AAY77135 standard; protein; 440 AA.
XX
AC AAY77135;
XX
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype B (BoNTB) C-terminal fragment.
XX
KW Botulinum neurotoxin; heavy chain; BoNT; serotype B; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX
OS Clostridium botulinum.
```

CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
SQ Sequence 413 AA;

AAB04097 Length: 413 August 31, 2004 14:39 Type: P Check: 8861 ..
Found using 'seq23' (hayes346.key)

...
80 VYKQPAKKIFTDENTIFQYLSQTFPLDIRDLSLTSFDDALLFSNKVYSFESMDYIK
130
140 TANKVVEAGLFAGVVKQVINDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
183
200 ENAFETAGASILLEFIPELLIPVVGAFLLSYIDNKNKIITIDNALTKRKNKWSMDYGL
257
260 IVAQWLSTVNTQFYTIKEGMYKALNYQAQALEEIIKYRNYIYSEKEKSNINIDFNDSK
280
320 LNEGINQAIDNINNFINGCSVSLMKKNIPLA

8 matches found in sequence:
aab04098 ; Botulism toxin heavy chain N-terminal sequence (serotype C).
(from "Bt_ags.pep")
TOIG of: aab04098 check: 8744 from: 1 to: 399

ID AAB04098 standard; protein; 399 AA.
AC AAB04098;
XX
XX Botulism toxin heavy chain N-terminal sequence (serotype C).
DE Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO2000067700-A2.
XX
PD 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-013386SP.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;

WPI; 2001-016048/02.

N-PSDB; AAA54494.

New nucleic acids encoding the carboxy- or amino-terminal portions of the heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine against botulism.

Claim 6; Fig 13b; 73pp; English.

Botulism neurotoxins are translated as a single 150 kDa polypeptide chain and then posttranslationally nicked, forming a dichain consisting of a 100 kDa heavy chain and a 50 kDa light chain which remain linked by a disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT) can be used in recombinant expression vectors and expressed in transformed cells to produce peptide antigens useful for eliciting an immune response to give protective immunity against botulinum neurotoxin, which causes botulism. The nucleic acids are expressible in a recombinant organisms such as Escherichia coli or Pichia pastoris. The use of recombinant nucleic acids are advantageous since it eliminates the need to culture large quantities of hazardous toxin-producing bacterium. Production yield from the genetically engineered product is also high and cost of production is lower. The nucleic acids can be derived from Clostridium botulinum serotypes A-G

SQ Sequence 399 AA;

AAB04098 Length: 399 August 31, 2004 14:39 Type: P Check: 8744 ..
Found using 'seq23' (hayes346.key)

...
23 IGDISDVKTDFILRKDINEETEVIYYPDVSVDQVILSKNTSEHGQDLILYPSIDSESI
73 76
83 LPEQGVFDNRTQNDVYLSYVYLESQKLSNDVEDFTFTRSTEEALDMSAKVYTFPTL
104
143 ANKNVAGVQGLFWANDVVEDFTTNILRKDTLDKISDVSAIIPYIGFALNLSVRRG
203 NFEAPAVTGVITLLEAPPEFTIPALGAFVYSKVQERNEIITKIDNCLEQRIKRWKDSY
234
263 EWMGTLSRIITQFNNISYOMYSLSNQAGAKAKIDLEYKYSKSDKENIKSQVENLK
265 282 303
323 NSLDVKISEAMNNINKFIRECSVTYLFKNMLPKV

9 matches found in sequence:
aab04099 ; Botulism toxin heavy chain N-terminal sequence (serotype D).
(from "Bt_ags.pep")
TOIG of: aab04099 check: 4483 from: 1 to: 386

ID AAB04099 standard; protein; 386 AA.
XX
AC AAB04099;
XX
XX 11-APR-2001 (first entry)
XX
DE Botulism toxin heavy chain N-terminal sequence (serotype D).

CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 254 AA;

AAAY30119 Length: 254 August 31, 2004 14:39 Type: P Check: 7873 ..
Found using 'seq23' (hayes346.key)

...

66 GLEWIGRIDPANGNTEYDFKFOGKAITADTSSNTVNLQLSSLTSETAVYYCAGSGELG
116

126 FPYWGQGLTVTSAAKTTTPSVVPLAPGSAQTSMVTLGCLVKGYFPEPVTVTWNSGSL
148

186 SSGVHTFPVAVLDYLTGLSSVTVPSTWPFSETVTCNVAHPASSTKVDKIVPRDCTSGG
198

246 GGSHHH

...

1 match found in sequence:
aay30120 ; Murine anti-botulinum toxin antibody fragment (BotFab 20) light cha
(from "bt_ags.pep")
TOIG of: aay30120 check: 4781 from: 1 to: 236

ID AAY30120 standard; protein; 236 AA.
XX
AC AAY30120;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 20) light chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW Clostridium botulinum; detection.
XX
OS Mus musculus.

XX US5932449-A.
XX 03-AUG-1999.
XX
PF 30-JAN-1997; 97US-00792824.
XX
PR 01-FEB-1996; 96US-0011013P.
XX
PA (USSA) US SEC OF ARMY.
XX
PI Burans JP, Emanuel PA, Valdes JU, Eldefrawi ME;
XX
DR WPI; 1999-492692/41.
DR N-PSDB; AAX86666.
XX
PT Detection of botulinum toxin.

XX Claim 15; Col 31-34; 24pp; English.
XX
CC This sequence represents the light chain of BotFab 20, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non

CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 236 AA;

AAAY30120 Length: 236 August 31, 2004 14:39 Type: P Check: 4781 ..
Found using 'seq23' (hayes346.key)

...

4 LUPTAAGLLLLAAQPAMADIQWTSFASLSASVGETVITCRASGNHNYLAWYQKQKQ
54 57

64 KSPQLLVYNAKTLADGVPSRFSGSGSGTQYSLKINSIQPEDFGS

...

2 matches found in sequence:
aay30121 ; Murine anti-botulinum toxin antibody fragment (BotFab 20) heavy cha
(from "bt_ags.pep")
TOIG of: aay30121 check: 7921 from: 1 to: 254

ID AAY30121 standard; protein; 254 AA.

XX
AC AAY30121;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 20) heavy chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW Clostridium botulinum; detection.

XX Mus musculus.

XX US5932449-A.

XX 03-AUG-1999.

XX 30-JAN-1997; 97US-00792824.

XX 01-FEB-1996; 96US-0011013P.

XX (USSA) US SEC OF ARMY.

XX Burans JP, Emanuel PA, Valdes JU, Eldefrawi ME;

XX WPI; 1999-492692/41.

XX N-PSDB; AAX86666.

XX Detection of botulinum toxin.

XX Claim 15; Col 33-36; 24pp; English.

XX This sequence represents the heavy chain of BotFab 20, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non

CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting
 CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial cultures.
 CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
 CC and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 254 AA;

AAV30121 Length: 254 August 31, 2004 14:39 Type: P Check: 7921 ..
 Found using 'seq23' (hayes346.key)

...

66 GLEWIGRIDPANGNTEYDKPRFQGRKATITADTSTNTVNLSLTSEDTAVYCSGGELG
 |--|
 116

126 FFWGQGLTVTSAKTPSPVPLAAGSRAQTNSMTLGLVKGYFPEPVVTWNSGL
 |--|
 148

186 SSGVHTFPVQLQSDLY

...

 1 match found in sequence:
 aay30122 ; Murine anti-botulinum toxin antibody fragment (BotFab 22) light cha
 (from "bt_ags.pep")
 TOIG of: aay30122 check: 4781 from: 1 to: 236

ID AAY30122 standard; protein; 236 AA.
 XX
 AC AAY30122;
 XX
 DT 20-OCT-1999 (first entry)
 XX
 DE Murine anti-botulinum toxin antibody fragment (BotFab 22) light chain.
 XX
 KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
 KW Clostridium botulinum; detection.
 XX
 OS Mus musculus.
 XX
 PN US5932449-A.
 XX
 PD 03-AUG-1999.
 XX
 PF 30-JAN-1997; 97US-00792824.
 XX
 PR 01-FEB-1996; 96US-0011013P.
 XX
 PA (USSA) US SEC OF ARMY.

XX Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
 XX
 PI WPI; 1999-492692/41.
 XX
 DR N-PSDB; AAX86667.
 XX
 PT Detection of botulinum toxin.

XX Claim 25; Col 39-40; 24pp; English.
 XX

CC This sequence represents the light chain of BotFab 22, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC isolated and sequenced. Botulinum neurotoxin is produced as several
 CC

CC with non-neurotoxic proteins. The rFab of this invention binds to the non
 CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting
 CC botulinum toxins in food and are also useful in health care and in
 CC military applications. They are less expensive to produce than monoclonal
 CC antibodies as they can be isolated from large scale bacterial
 CC cultures. Also, the affinity of an rFab may be altered by mutagenesis of
 CC its gene and subsequent screening of the expressed rFabs
 XX
 SQ Sequence 236 AA;

AAV30122 Length: 236 August 31, 2004 14:39 Type: P Check: 4781 ..
 Found using 'seq23' (hayes346.key)

...

4 LLPTAAAGLLLLAAQPAADIQMTQSPASLSASVGETVTITCRASGNIHNYLAWYQKQG
 |--|
 54 57

64 KSPQLLVYNAKTLADGVPSRFSGSGGTQYSLKINSIQPEDFGS

...

 2 matches found in sequence:
 aay30123 ; Murine anti-botulinum toxin antibody fragment (BotFab 22) heavy cha
 (from "bt_ags.pep")

TOIG of: aay30123 check: 7711 from: 1 to: 254

ID AAY30123 standard; protein; 254 AA.
 XX
 AC AAY30123;
 XX
 DT 20-OCT-1999 (first entry)
 XX
 DE Murine anti-botulinum toxin antibody fragment (BotFab 22) heavy chain.
 XX
 KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
 KW Clostridium botulinum; detection.
 XX
 OS Mus musculus.
 XX
 PN US5932449-A.
 XX
 PD 03-AUG-1999.
 XX
 PF 30-JAN-1997; 97US-00792824.
 XX
 PR 01-FEB-1996; 96US-0011013P.
 XX
 PA (USSA) US SEC OF ARMY.

XX Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
 XX
 PI WPI; 1999-492692/41.
 XX
 DR N-PSDB; AAX86667.
 XX
 PT Detection of botulinum toxin.

XX Claim 22; Col 41-42; 24pp; English.
 XX

CC This sequence represents the heavy chain of BotFab 22, a murine
 CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
 CC and B. A cDNA library was made from mouse mRNA isolated from mice
 CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
 CC chains were expressed in phage display libraries and screened for their
 CC ability to bind to botulinum toxin types A or B. The clones were then
 CC antigenically distinct serotypes (A-G) and is non-covalently associated
 CC with non-neurotoxic proteins. The rFab of this invention binds to the non
 CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
 CC antibody fragments are able to act as immunosensors for detecting

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> O <
O | | O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23ags" --

Selected search type is key against sequence data banks or files.
Selected scope is Sequence.
Selected sequence key from "hayes346.key":
1 seq23 (AA) ID seq23 AA preliminary pattern
2 followed by
2 y
2 any character
2 any character
2 1 or i or m or a or f or w or v or y

Selected files:
File : bt_ags.pep

-- Output Parameters --

Format Options:
Nucleic acid code matching Exact Indirect file
Find non-matching hits only No Sequence or key file
Report key used Yes List of hits
Note position of hit Yes Hit display
Display full annotations Yes Name and annotations
Sequence context 50

No
No
Yes
Yes
Yes
Yes

21 matches found in sequence:
aab04081; Botulinum toxin heavy chain (serotype A).
(from "bt_ags.pep")
TOIG of: aab04081 check: 1164 from: 1 to: 847

ID AAB04081 standard; protein; 847 AA.
XX
AC AAB04081;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulinum toxin heavy chain (serotype A).
XX
KW Botulinum; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FH Key Location/Qualifiers
FT Misc-difference 821
FT /note= "Gly or Arg"
XX
PN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI; 2001-016048/02.
XX
PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Page 12; 73pp; English.
XX
CC Botulinum neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
SQ Sequence 847 AA;

AAB04081 Length: 847 August 31, 2004 14:39 Type: P Check: 1164 ..
Found using 'seq23' (hayes346.key)

...

5 LCIKVNNWDLFFSPSEDNFTNDLNGEITSDINIEAAEENISLDLIQQVYLTFFDNEP
55 58
65 ENISTENLSSDIIGQLELMPNIERPFGKKYELDKYTMFHYLRAQEFHGHKSRIALTNSV
100 105
125 NEALLNPSRVYTFSSDYVKVKNKATEAAMFLGWVEQLVYDFDTESEVSTTDKIADIIT
135
185 IIPY
...
211 GAVILLEFIPETAIPLVLTGTFALVSVYIANKVLTVQTIDNALSKRNEKWDVYKYIVTNWLA
261
271 KVTQIDLIRKKMKEALENQAEATKAIINYQNQYTEEKKNINFINIDLSKLNESINK
302
331 AMININKELNQCSVSYLMNSMIPYGVKRLDFDASLKDALLKVYIRDNYGTGLIQVDRLKD
378
391 KVNNTLSTDIPFQLSKYVDNQRLLSFTTEYIKNIINTSIILN
...
|---|
```

435	ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLEFNLESSKIEVILKNAIVVNSMVNFST	485	489
495	SWTIRIPKVFNSISLNNEYTIINCMMENNSGWKVSINYGELIWTILQDQOIKQRVVFKYSQ	513	552
555	MINISDYINRWIFVTITNRLNNSKIYTINGRLIDQKPFISNLGNIHASNNIMFKLDGCRD		
615	THRYIWKYFNLPDKELNEKEIKDYDNQNSGILKDPFGDYLOYDKFYVMLLYDPNKY	618 623	674
675	VDVNVGIRGYMYLKGPRGSVMTTNIYVLSLYRGTKFIIKKASGNKDNIVRNDRVVIN	677	732
735	VVVKNKYRILATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNCKRMNLQDNN	735	742
795	G		
...			

17 matches found in sequence:			
aab04082 ; Botulism toxin heavy chain (serotype B).			
(from "bt_ags pep")			
TOIG of: aab04082 check: 6439 from: 1 to: 848			
ID	AAB04082 standard; protein; 848 AA.		
XX	AC		
XX	AC		
XX	AC		
DT	11-APR-2001 (first entry)		
XX	Botulism toxin heavy chain (serotype B).		
XX	Botulism; toxin; neurotoxin; heavy chain; recombinant expression;		
KW	recombinant vector; antigen; immune response; vaccine; bacterium;		
KW	infection.		
XX	Clostridium botulinum.		
OS	WO200067700-A2.		
XX	PN		
XX	PD		
XX	PD		
XX	16-NOV-2000.		
XX	12-MAY-2000; 2000WO-US012890.		
XX	12-MAY-1999; 99US-0133865P.		
PR	12-MAY-1999; 99US-0133866P.		
PR	12-MAY-1999; 99US-0133867P.		
PR	12-MAY-1999; 99US-0133868P.		
PR	12-MAY-1999; 99US-0133869P.		
PR	12-MAY-1999; 99US-0133873P.		
PR	29-JUL-1999; 99US-0146192P.		
XX	(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.		
PA			
XX			
PI	Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;		
XX			
DR	WPI; 2001-016048/02.		
XX			
PT	New nucleic acids encoding the carboxy- or amino-terminal portions of the		
PT	heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine		

PT	against botulism.		
XX	Disclosure; Page 13; 73pp; English.		
XX	Botulism neurotoxins are translated as a single 150 kDa polypeptide chain		
CC	and then posttranslationally nicked, forming a dchain consisting of a		
CC	100 kDa heavy chain and a 50 kDa light chain which remain linked by a		
CC	disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino		
CC	-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)		
CC	can be used in recombinant expression vectors and expressed in		
CC	transformed cells to produce peptide antigens useful for eliciting an		
CC	immune response to give protective immunity against botulinum neurotoxin,		
CC	which causes botulism. The nucleic acids are expressible in a recombinant		
CC	organisms such as Escherichia coli or Pichia pastoris. The use of		
CC	recombinant nucleic acids are advantageous since it eliminates the need		
CC	to culture large quantities of hazardous toxin-producing bacterium.		
CC	Production yield from the genetically engineered product is also high and		
CC	cost of production is lower. The nucleic acids can be derived from		
CC	Clostridium botulinum serotypes A-G		
XX	Sequence 848 AA;		
SQ			
AAB04082	Length: 848 August 31, 2004 14:39 Type: P Check: 6439 ..		
	Found using 'seq23' (hayes346.key)		
...			
79	VYEQPAIKKIFTDENTIFQYLYSQTFPLDIRDISLTSSPDDALLFSNKVVSFFSMDYIK	129	
139	TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF	182	
199	ENAFETAGASILLEFPELLIPVVGAFLESYIDNKNKIITIDNALTKRNEKWSMDMYGL	256	
259	IVAOWLSTVNTQFTYIKEGMYKALNYQAQALEELIKYRYNIYSEKEKSNNIDNFDNSK	279	
319	LNIGINQAIDNINNFGSCSVILMKKMIPLA	297	
...			
397	FOLSIYNTDTILIEFMFNKYNSEILNIIILNRYKDNLDLSGYGAKVEYDGVDELNKN	447	
457	QFKLTSSANSKIRTTQNTQNIIFNSVFLDFSVPWIRIPKYKNDGIQNIHNEYTIINCMK	509	
517	NNSGWKISIRGRIITWLTIDINGKTKSVFFEYNIREDISEYINRWFF		
...			
566	TNNLNNAKIYINGKLESNTDIKDIREVIANGELIFKLDGDIRTQPTIMMKYFIFNTELS	616	
626	QSNIEERYKIQSYSEVILKDFWGNPLMYNKEYYMFNAGNKNSYTIKLKDSFVGEILTRSK	656	
686	YNQNSKYINRYDLYIGEKFTIRKNSKSQSINDDIVRKEDYILDFFNLNQEWRYTYKYF	692	727

```

746 KKEELFLAPISDSDEFYNTIQIKEYDEQTYSCQLLFKKDEESTDEIGLIGHRPYESG
      |---|
      763
806 IVFEVKDVFICISDWYLEVKRKPYNLKLGSCNQFIPKDRGWTE
      |---|
      821

-----
13 matches found in sequence:
aab04083 ; Botulism toxin C fragment sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04083 check: 3256 from: 1 to: 415

ID AAB04083 standard; protein; 415 AA.
XX
AC AAB04083;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulism toxin C fragment sequence (serotype A).
XX
KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI; 2001-016048/02.
XX
New nucleic acids encoding the carboxy- or amino-terminal portions of the
heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
against botulism.
XX
Example 7; Page 36; 73pp; English.
XX
Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
and then posttranslationally nicked, forming a dichain consisting of a
100 kDa heavy chain and a 50 kDa light chain which remain linked by a
disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
can be used in recombinant expression vectors and expressed in
transformed cells to produce peptide antigens useful for eliciting an
immune response to give protective immunity against botulinum neurotoxin,
which causes botulism. The nucleic acids are expressible in a recombinant
organism such as Escherichia coli or Pichia pastoris. The use of
recombinant nucleic acids are advantageous since it eliminates the need
to culture large quantities of hazardous toxin-producing bacterium.
Production yield from the genetically engineered product is also high and
cost of production is lower. The nucleic acids can be derived from
Clostridium botulinum serotypes A-G
XX
Sequence 415 AA;
SQ
AAB04083 Length: 415 August 31, 2004 14:39 Type: P Check: 3256
..

Found using 'seq23' (hayes346.key)
...
3 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQIFNLESSKIEVILKNAIVYMSMYENFST
      |---| |---|
      53 56 57 60
63 SFWIRIPKYFNSISLNNEVTIINCENNSNGWKVSLNYGELIWTLDQTQELKQRVVFKYSQ
      |---| |---|
      81 84 99 102 120
123 MINISDYINRWIFVTITNRLNNSKIYINGRLIDOKPISNLGNIHASNNIMFKLDGCRDT
      |---| |---|
      123 185 190 223 230 241
183 HRYTIWFYFNLFDELKEIKDYDNQNSGILKDFWGDYLOQDKPYTMLNLNYDPNKTV
      |---| |---|
      185 190 223 230 241
243 DNNVGIRGYMYLKGPRGSMVTITNLYNSSLRYGTGFIKKYASGNKDNIVRNNDRVYIN
      |---|
      244 252 300
303 VVVKNKYLRLATNASQAGVEKILSALIEIPDVGNLQVVMVMSKNDQGITNKCKMNLQDNN
      |---|
      303 310 363 G
...

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14 matches found in sequence:
aab04085 ; Botulism toxin C fragment sequence (serotype B).
(from "bt_ags.pep")
TOIG of: aab04085 check: 1259 from: 1 to: 439

ID AAB04085 standard; protein; 439 AA.
XX
AC AAB04085;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulism toxin C fragment sequence (serotype B).
XX
KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Clostridium botulinum.
XX
FN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI; 2001-016048/02.
XX
US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
WPI; 2001-016048/02.
```

XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.

XX Example 8; Page 38; 73pp; English.

XX Botulinum neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organism such as *Escherichia coli* or *Pichia pastoris*. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC *Clostridium botulinum* serotypes A-G

XX Sequence 439 AA;

AA04085 Length: 439 August 31, 2004 14:39 Type: P Check: 1259 ..
Found using 'seq23' (hayes346.key)

1 FNKYNSEILNIIILNRYKDNLDLGSYGAKVYDGVDELNDKNQFKLTSSANSKIRVT
36 39

61 QNQNIIENSVELDFSVFWIRPKYKNDGIONYIHNEYTIINCMMNNSGKWSIRGNRIT
98 101

121 WTLIDINGTKSVFFEYNIREDISEYINRWF

156 TNNLNNAKIYINGKLENTDIKDIREVIANGEEIFKLDGIDIRTOFIWMKYFSIFNTELS
206

216 QSNIEERYKIQSYSEYLKDFWGNFLMYNKYTFMAGNKNYSYIKLKKDSPVGEILTRSKY
228 246 257

276 NONSKYINVRDLYIGKEFIIRKKSNSQSIINDIVRKEDYIYLDFFNLNQEQRVVYKKFK
281 284 314 316 331

336 KEEKFLFAPISDSDEFYNTIQIKEYDEQPTYSCQLLFKKDEESTDEIGLIGIHRFVESG
353

396 IVFEEYKDYFCISKWYLKEVKRPYNLKLGNWQFIKDEGWTE
401 404

13 matches found in sequence:
aab04088 ; Botulinum toxin heavy chain C-terminal sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04088 check: 7894 from: 1 to: 437

ID AAB04088 standard; protein; 437 AA.
XX
AC AAB04088;

XX 11-APR-2001 (first entry)
XX Botulinum toxin heavy chain C-terminal sequence (serotype A).

XX Botulinum toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.

XX Synthetic.
OS *Clostridium botulinum*.
XX WO200067700-A2.

XX 16-NOV-2000.

XX 12-MAY-2000; 2000WO-US012890.

XX 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI; 2001-016048/02.
XX N-PSDB; AAA54482.

XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.

XX Claim 3; Fig 1b; 73pp; English.

XX Botulinum neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organism such as *Escherichia coli* or *Pichia pastoris*. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC *Clostridium botulinum* serotypes A-G

XX Sequence 437 AA;

AA04088 Length: 437 August 31, 2004 14:39 Type: P Check: 7894 ..
Found using 'seq23' (hayes346.key)

...

25 ESNHLIDLSRYASKINIGKVNFPDIDKNQIQLENLESSKIEVLKNAIVNSMYENFST
75 78 79 82

85 SFWIRPKYFNSISLNNYEYTIINCMMNNSGKWSYLNGLTWLQDTQEIQRVVFYKYSQ
103 121 122 142

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145  MINISDYINRWIFVTITNRLNNSKIYINGRLIDQXPISNLGNIHASNNIMFKLDGCRDT
146  |
205  HRYIWKYFNLFDFKELNEKEIKLDYDQNSGILKDFWGDYLYQDKPYMYMLNLYDPNKVY
206  |
265  DVNVVGIRGYMYLKGPRGSVMTNTIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
266  |
325  VVVKNEKYLATNASQAGVEKILSALEIPDVGNLSQVVMVMSKNDQGITNCKMNLQDNN
326  |
385  G

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13 matches found in sequence:
aab04089 ; Botulism toxin heavy chain C-terminal sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04089 check: 9281 from: 1 to: 434

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ID AAB04089 standard; protein; 434 AA.
XX
AC AAB04089;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulism toxin heavy chain C-terminal sequence (serotype A).
XX
KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.
XX
PR 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133870P.
PR 29-JUL-1999; 99US-0146192P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
DR WPI; 2001-016048/02.
DR N-PSDB; AAA54483.
XX

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PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
PS Disclosure; Fig 2b; 73pp; English.
XX
CC Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in

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CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
SQ Sequence 434 AA;
AAB04089 Length: 434 August 31, 2004 14:39 Type: P Check: 9281 ..
Found using 'seq23' (hayes346.key)
...
22  ESNHLIDLSRYASKINIGSKVNFDPIDKNOIQLEFNLESSKIEVILKNAIVYMSYENFST
72 75
76 79
82  SPWIRIPKYFNSISLNNEYTIINCMMENNSGKWSLYNGELIWTLTQDTQEIQRVVPKYSQ
100 118
119
142  MINISDYINRWIFVTITNRLNNSKIYINGRLIDQXPISNLGNIHASNNIMFKLDGCRDT
143  |
202  HRYIWKYFNLFDFKELNEKEIKLDYDQNSGILKDFWGDYLYQDKPYMYMLNLYDPNKVY
203  |
262  DVNVVGIRGYMYLKGPRGSVMTNTIYLNSSLYRGTKFIKKYASGNKDNIVRNNDRVYIN
263  |
322  VVVKNEKYLATNASQAGVEKILSALEIPDVGNLSQVVMVMSKNDQGITNCKMNLQDNN
323  |
382  G
...
-----
13 matches found in sequence:
aab04090 ; Botulism toxin heavy chain C-terminal sequence (serotype A).
(from "bt_ags.pep")
TOIG of: aab04090 check: 2069 from: 1 to: 435
ID AAB04090 standard; protein; 435 AA.
XX
AC AAB04090;
XX
DT 11-APR-2001 (first entry)
XX
DE Botulism toxin heavy chain C-terminal sequence (serotype A).
XX
KW Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
PN WO200067700-A2.
XX
PD 16-NOV-2000.
XX
PF 12-MAY-2000; 2000WO-US012890.

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XX 12-MAY-1999; 99US-0133865P.
PR 12-MAY-1999; 99US-0133866P.
PR 12-MAY-1999; 99US-0133867P.
PR 12-MAY-1999; 99US-0133868P.
PR 12-MAY-1999; 99US-0133869P.
PR 12-MAY-1999; 99US-0133873P.
PR 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI: 2001-016048/02.
XX N-PSDB; AAA54484.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Fig 3b; 73pp; English.
XX
XX Botulin neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 435 AA;
SQ
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AAB04090 Length: 435 August 31, 2004 14:39 Type: P Check: 2069 ..
Found using 'seq23' (hayes346.key)
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...
14 matches found in sequence:
aab04091 ; Botulinism toxin heavy chain C-terminal sequence (serotype B) .
(from "bt_ags.pep")
TOIG of: aab04091 check: 6014 from: 1 to: 440

ID AAB04091 standard; protein; 440 AA.
XX
XX AAB04091;
AC
XX 11-APR-2001 (first entry)
DT
XX Botulinism toxin heavy chain C-terminal sequence (serotype B) .
DE
XX Botulinism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS
XX Clostridium botulinum.
OS
XX WO2000067700-A2.
PN
XX 16-NOV-2000.
PD
XX 12-MAY-2000; 2000WO-US012890.
PP
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX WPI: 2001-016048/02.
XX N-PSDB; AAA54485.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Claim 3; Fig 4b; 73pp; English.
XX
XX Botulin neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 440 AA;
SQ
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AAB04091 Length: 440 August 31, 2004 14:39 Type: P Check: 6014 ..
Found using 'seq23' (hayes346.key)
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1 MANKYNSEILNRIILNRYKDNLDLSGYGAKVEYDGVDELNDKQFKLTSSANSKIRV
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DR WPI; 2001-016048/02.
DR N-PSDB; AAA54486.
XX
PT New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
PS Claim 3; Fig 5b; 73pp; English.
XX
CC Botulin neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
SQ Sequence 450 AA;
AA04092 Length: 450 August 31, 2004 14:39 Type: P Check: 8215 .
Found using 'seq23' (hayes346.key)
...
40 NTLVDTSGYNAEVSBEQVQLNPFPDFKLGSGEDRGKVIQTQENIVYNSMVEPSI
163 90 93 94 97
100 SFWIRINKWVSNLPGYTIIDSVKNSGWSIGIISNLFVFTLKQNEDEQSINFSYDISNN
115
160 AFGYKWKFFVTVTNNMGMKIYINGKLIDTIKVKELTGINFSKTITFEINKIPDTGLIT
163
220 SPSDNNINMWIRDFYIFAKELDGKDINILFNSLOYTNVVKDYWGNDLRYNKETYMNIDYL
233 253 271
280 NRYMYANGSRQIVENTRRNNNDPNEGKIIIKRIRGNTDTRVRGGDILYFDMTINNKAYN
282 305 308 328 338
340 LFMKNETMYADNHSTEDIYAGLRQETKDINDNIIIFIQIPMNTTYIYASQIFKSNFNGEN
341 384
400 ISGICISGTYRFRLOGDMVHRHNYLVPTVKQGNYSALLSESTHGWGFVPVSE
432
-----
9 matches found in sequence:
aab04093 : Botulinum toxin heavy chain C-terminal sequence (serotype D).
(from "bt_ags.pep")
TOIG of: aab04093 check: 75 from: 1 to: 451
ID AAB04093 standard; protein; 451 AA.
XX
AC AAB04093;
XX
DT 11-APR-2001 (first entry)

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(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;


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SQ      Sequence 382 AA;
AAB04100 Length: 382 August 31, 2004 14:39 Type: P Check: 1971 ..
Found using 'seq23' (hayes346.key)
...
50      ILNFSEAPGLSDEKLNLTQNDAYIPKYDSNGTSDIEQHDVNELNVFYLDQKVPEG
      100
110     ENNVLTSSIDTALLEQPKLYTFSSFINNVNKPQOALFVSWIQOVLVDFTTEANQKS
      130
170     TVDKTIADISIVPYIGLALNIGNEAQKGNFKDALELLGAGILLEPEPELLIPTILVFTIK
      183
230     SFLGSSDNKNKVIKAINNALKERDEKWEYGFIVSNWMTKINTOFNKRKEQMYQALQNG
      260
290     VNAIKTIIESKYNSTLEEKNELTNKYDIKQIENELNQKVSIAMNNIDRFLTESSISYLM
      301
350     KLINE
...
-----
6 matches found in sequence:
aab04101 ; Botulism toxin heavy chain N-terminal sequence (serotype F).
(from "bt_ags.pep")
TOIG of: aab04101 check: 9812 from: 1 to: 408

ID      AAB04101 standard; protein; 408 AA.
XX      AAB04101;
AC      AAB04101;
XX      11-APR-2001 (first entry)
XX      Botulism toxin heavy chain N-terminal sequence (serotype F).
XX      Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW      recombinant vector; antigen; immune response; vaccine; bacterium;
KW      infection.
XX      Synthetic.
OS      Clostridium botulinum.
XX      WO200067700-A2.
XX      16-NOV-2000.
XX      12-MAY-2000; 2000WO-US012890.
XX      12-MAY-1999; 99US-0133865P.
XX      12-MAY-1999; 99US-0133866P.
XX      12-MAY-1999; 99US-0133867P.
XX      12-MAY-1999; 99US-0133868P.
XX      12-MAY-1999; 99US-0133869P.
XX      12-MAY-1999; 99US-0133873P.
XX      29-JUL-1999; 99US-0146192P.
XX      (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX      Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI      WPI; 2001-016048/02.
XX      DR      N-PSDB; AAA54497.
XX

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PT      New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT      heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX      against botulism.
PS      Claim 6; Fig 16b; 73pp; English.
XX
CC      Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC      and then posttranslationally nicked, forming a dichain consisting of a
CC      100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC      disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC      -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC      can be used in recombinant expression vectors and expressed in
CC      transformed cells to produce peptide antigens useful for eliciting an
CC      immune response to give protective immunity against botulinum neurotoxin,
CC      which causes botulism. The nucleic acids are expressible in a recombinant
CC      organisms such as Escherichia coli or Pichia pastoris. The use of
CC      recombinant nucleic acids are advantageous since it eliminates the need
CC      to culture large quantities of hazardous toxin-producing bacterium.
CC      Production yield from the genetically engineered product is also high and
CC      cost of production is lower. The nucleic acids can be derived from
CC      Clostridium botulinum serotypes A-G
XX
SQ      Sequence 408 AA;
AAB04101 Length: 408 August 31, 2004 14:39 Type: P Check: 9812 ..
Found using 'seq23' (hayes346.key)
...
43      NNYRNNDLVLDYNSQTIPQISNRTLTNLVDNSYVPRYDSNGTSEIEEYDVVDNFVFF
      93 96
103     YLHAQKVPEGETNISLTSSIDTALLEESKDIPFSSEFIDTINKPVNAALFIDWISKVIRD
      103
163     FTTEATQKSTVDKIADISLIVPYVGLALNIIIEAKGNFEAFELLGVGILLEFVPELTI
      185
223     FVLIVFTTKSYIDSYENKNAIKAINNSLIEREAKWEIYSWIVSNWLTRINTQFNKRKE
      262
283     QMYQALQGVDAIKTAIEYKYNNTSDEKNRLESEYNNINIEELNKKVSLAMKNIERFM
      303
343     TESSISYLMKLINE
...
-----
5 matches found in sequence:
aab04102 ; Botulism toxin heavy chain N-terminal sequence (serotype G).
(from "bt_ags.pep")
TOIG of: aab04102 check: 3960 from: 1 to: 410

ID      AAB04102 standard; protein; 410 AA.
XX      AAB04102;
AC      AAB04102;
XX      11-APR-2001 (first entry)
XX      Botulism toxin heavy chain N-terminal sequence (serotype G).
XX      Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW      recombinant vector; antigen; immune response; vaccine; bacterium;
KW      infection.
XX      Synthetic.
OS      Clostridium botulinum.

```

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XX WO200067700-A2.
XX
XX
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI; 2001-016048/02.
XX N-PSDB; AAA54498.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
XX heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX against botulism.
XX
XX Claim 6; Fig 17b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX and then posttranslationally nicked, forming a dichain consisting of a
XX 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
XX can be used in recombinant expression vectors and expressed in
XX transformed cells to produce peptide antigens useful for eliciting an
XX immune response to give protective immunity against botulinum neurotoxin,
XX which causes botulism. The nucleic acids are expressible in a recombinant
XX organisms such as Escherichia coli or Pichia pastoris. The use of
XX recombinant nucleic acids are advantageous since it eliminates the need
XX to culture large quantities of hazardous toxin-producing bacterium.
XX Production yield from the genetically engineered product is also high and
XX cost of production is lower. The nucleic acids can be derived from
XX Clostridium botulinum serotypes A-G
XX
XX Sequence 410 AA;
XX
XX AAB04102 Length: 410 August 31, 2004 14:39 Type: P Check: 3960 ..
XX Found using 'seq23' (hayes346.key)
XX
XX
XX 56 LILDNLSSGIDLPNTEPFTNDDIDIPYIKQSALKKIFVDGDSLFEYLHAQTFFSN
XX 106
XX
XX 116 IENQLTNSLDALRNNKNTVTFSTNLVEKANTVVGASLFPVNNVKGVIDFTSESTQKS
XX 136
XX
XX 176 TIDKVDVSIIPY
XX
XX
XX 213 GAAILMEFIPELIPIVGFPTLESYVGNKGHIIMTISNALKKRQKWDYGLIVSQWLS
XX 263
XX
XX 273 TVNTQFTYIKRMYNALNNQSAIEKIEIDQYNYRSEEDKMNINIDFNDIFKLNQSNIL
XX 286
XX 304
XX
XX 333 AINNIDDFINQCSISYLMNRMIPLA
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14 matches found in sequence:
aab04103 ; Botulism toxin heavy chain C-terminal sequence (serotype F) .
(from "bt_ags.pep")
TOIG of: aab04103 check: 8175 from: 1 to: 432

ID AAB04103 standard; protein; 432 AA.
XX
XX AAB04103;
XX
XX 11-APR-2001 (first entry)
XX
XX Botulism toxin heavy chain C-terminal sequence (serotype F) .
XX
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
XX recombinant vector; antigen; immune response; vaccine; bacterium;
XX infection.
XX
XX Synthetic.
XX OS Clostridium botulinum.
XX
XX WO200067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133873P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
XX WPI; 2001-016048/02.
XX N-PSDB; AAA54499.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
XX heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
XX against botulism.
XX
XX Disclosure; Fig 18b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
XX and then posttranslationally nicked, forming a dichain consisting of a
XX 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
XX disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
XX-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
XX can be used in recombinant expression vectors and expressed in
XX transformed cells to produce peptide antigens useful for eliciting an
XX immune response to give protective immunity against botulinum neurotoxin,
XX which causes botulism. The nucleic acids are expressible in a recombinant
XX organisms such as Escherichia coli or Pichia pastoris. The use of
XX recombinant nucleic acids are advantageous since it eliminates the need
XX to culture large quantities of hazardous toxin-producing bacterium.
XX Production yield from the genetically engineered product is also high and
XX cost of production is lower. The nucleic acids can be derived from
XX Clostridium botulinum serotypes A-G
XX
XX Sequence 432 AA;
XX
XX AAB04103 Length: 432 August 31, 2004 14:39 Type: P Check: 8175 ..
XX Found using 'seq23' (hayes346.key)
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1 MSYTNDKILILYFNKLYKKIKDINSILDMRYENKFKIDISGYGSINISGDIYIYSTNRNQ
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17 20
61  FGIYSSKPESEVNIAQNNDIYNGRYCNFSISFWVRIPKYFNKVLNNEXYTIIDCIRNNNS
    |---| |---| |---|
    85 88 109
121  GWKISLNKIIWTLODTAGNNQKLVFNTQMSISDYINKWIFVFTITNNRLGNSRIYIN
    |---| |---| |---|
    128 149
181  GNLIDEKISNLGDIHVSNDILFKIVGCDNTFYVGIRVEKVPDTELKTEIETLYSDEPD
    |---| |---| |---|
    213 218
241  PSILKDFWGNLYLLYKRYVLLNLLRLTRKSIQNSNLFNINQORGVYQKFNFSNTRLYTG
    |---| |---| |---|
    251 258 298
301  VEVIIKNGSGTDSITDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIIKLIRTSNS
    |---| |---| |---|
    301 327 337 340
361  NNSLGQIIVMSIGNNCTWNFQNNNGNIGLLGFHSHNLVASSWYNNIRKNTSSNGCFW
    |---| |---|
    406
421  SFISKEHGQEN
-----
14 matches found in sequence:
aab04167 ; Botulinum toxin heavy chain C-terminal sequence (serotype G).
      (from "bt_ags.pep")
      TOIG of: aab04167 check: 8247 from: 1 to: 449

ID  AAB04167 standard; protein; 449 AA.
XX
AC  AAB04167;
XX
DT  11-APR-2001 (first entry)
XX
DE  Botulinum toxin heavy chain C-terminal sequence (serotype G).
XX
KW  Botulinum toxin; neurotoxin; heavy chain; recombinant expression;
KW  recombinant vector; antigen; immune response; vaccine; bacterium;
KW  infection.
XX
OS  Synthetic.
OS  Clostridium botulinum.
XX
FN  WO2000067700-A2.
XX
PD  16-NOV-2000.
XX
PF  12-MAY-2000; 2000WO-US012890.
XX
PR  12-MAY-1999; 99US-0133865P.
PR  12-MAY-1999; 99US-0133866P.
PR  12-MAY-1999; 99US-0133867P.
PR  12-MAY-1999; 99US-0133868P.
PR  12-MAY-1999; 99US-0133869P.
PR  12-MAY-1999; 99US-0133870P.
PR  29-JUL-1999; 99US-0146192P.
XX
PA  (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI  Smith IA, Byrne MP, Middlebrook JL, Lapenotiere H;
XX
DR  WPI; 2001-016048/02.
XX  N-PSDB; AAA54491.
XX
PT  New nucleic acids encoding the carboxy- or amino-terminal portions of the
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heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
against botulism.
Claim 3; Fig 10b; 73pp; English.
Botulin neurotoxins are translated as a single 150 kDa polypeptide chain
and then posttranslationally nicked, forming a dichain consisting of a
100 kDa heavy chain and a 50 kDa light chain which remain linked by a
disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
-terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
can be used in recombinant expression vectors and expressed in
transformed cells to produce peptide antigens useful for eliciting an
immune response to give protective immunity against botulinum neurotoxin,
which causes botulism. The nucleic acids are expressible in a recombinant
organism such as Escherichia coli or Pichia pastoris. The use of
recombinant nucleic acids are advantageous since it eliminates the need
to culture large quantities of hazardous toxin-producing bacterium.
Production yield from the genetically engineered product is also high and
cost of production is lower. The nucleic acids can be derived from
Clostridium botulinum serotypes A-G
Sequence 449 AA;
AAB04167 Length: 449 August 31, 2004 14:39 Type: P Check: 8247 ..
Found using 'seq23' (hayes346.key)
...
28  RGGRLIDSSGYGATMNVGSDVIFNDIGNGQFKLNNSNSNITAHQSKFVVYDSMDFNFSI
    |---| |---|
    78 81
88  NEWRTPKYNNNDIQTYLQNEYTIISCIKNDSGWKSVIKGNRIIWTLIDVNAKSKSIPFE
    |---|
    109
148  YSIKNDISDYINKWF
...
208  TDTTFVWLKDFNIFGRELNATEVSSLYWISQSTNTLTKDFWGNPLRYDTQYYLFGNQMQN
    |---| |---|
    258
268  IYIKYFSKASMGETAPRTNFNNAINYNQNLXGLRFLFIKKAASNRNNDNIVREGDYIY
    |---| |---| |---|
    269 294 298 325 327
    --| |---| |---| |---|
    328 330 338 341 365
328  LNIDNISDESVRVYLVNSKEIQTLFLAPINDDPTFFYDVLQIKKYKTYNQCILCEK
    |---| |---|
    365
388  DTKTGLFGIGKFKVDYGVVMDTYDNYFCISQWYLLRRISENINKLRLGNCWQFIPVDEGW
    |---| |---|
    404 411 414
448  TE
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7 matches found in sequence:
aab04168 ; Botulinum toxin heavy chain N-terminal sequence (serotype A).
      (from "bt_ags.pep")
      TOIG of: aab04168 check: 8975 from: 1 to: 413

ID  AAB04168 standard; protein; 413 AA.
XX
AC  AAB04168;
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XX 11-APR-2001 (first entry)
XX
XX Botulism toxin heavy chain N-terminal sequence (serotype A).
DE
XX Botulism; toxin; neurotoxin; heavy chain; recombinant expression;
KW recombinant vector; antigen; immune response; vaccine; bacterium;
KW infection.
XX
XX Synthetic.
OS Clostridium botulinum.
XX
XX WO2000067700-A2.
XX
XX 16-NOV-2000.
XX
XX 12-MAY-2000; 2000WO-US012890.
XX
XX 12-MAY-1999; 99US-0133865P.
XX 12-MAY-1999; 99US-0133866P.
XX 12-MAY-1999; 99US-0133867P.
XX 12-MAY-1999; 99US-0133868P.
XX 12-MAY-1999; 99US-0133869P.
XX 12-MAY-1999; 99US-0133870P.
XX 29-JUL-1999; 99US-0146192P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Byrne MP, Middlebrook JL, Lapenotiere H;
PI
XX WPI; 2001-016048/02.
DR N-PSDB; AAA54590.
XX
XX New nucleic acids encoding the carboxy- or amino-terminal portions of the
PT heavy chain of botulinum neurotoxin of serotype A-G, useful as vaccine
PT against botulism.
XX
XX Disclosure; Fig 11b; 73pp; English.
XX
XX Botulism neurotoxins are translated as a single 150 kDa polypeptide chain
CC and then posttranslationally nicked, forming a dichain consisting of a
CC 100 kDa heavy chain and a 50 kDa light chain which remain linked by a
CC disulfide bond. Nucleic acids encoding the carboxy-terminal (HC) or amino
CC -terminal (HN) portion of the heavy chain of botulinum neurotoxin (BoNT)
CC can be used in recombinant expression vectors and expressed in
CC transformed cells to produce peptide antigens useful for eliciting an
CC immune response to give protective immunity against botulinum neurotoxin,
CC which causes botulism. The nucleic acids are expressible in a recombinant
CC organisms such as Escherichia coli or Pichia pastoris. The use of
CC recombinant nucleic acids are advantageous since it eliminates the need
CC to culture large quantities of hazardous toxin-producing bacterium.
CC Production yield from the genetically engineered product is also high and
CC cost of production is lower. The nucleic acids can be derived from
CC Clostridium botulinum serotypes A-G
XX
XX Sequence 413 AA;
XX
AB04168 Length: 413 August 31, 2004 14:39 Type: P Check: 8975 ..
Found using 'seq23' (hayes346.key)
...
6 LCIKVNNWDLFFSPSDNFTNDLNKGEBITSDTNIIEAAEENISLDLIQQVYLTFFDNEP
|---|
56 59
66 ENTSIENLSSDIIGQELMPNIEFPNGKYVELDKYTMFHYLRQAQEPHGKSRIALTNSV
|---|
101 106
126 NEALLNPSRVYTFPSDDYKVKNKATEAMFLGWQVLVYDFTDSEVSTTDKIADITI
|---|
136
```

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186 IIPY
...
213 GAVILLEFIEIPAIVLGTALVSYIANKVLVTQTIDNALSKEKWEVKYIVTWNLA
|---|
263
273 KVTQTIDLIRKKWKEALENOAEATKALINQYQNYTEEEKNNINFNIDDLSSKLNESINK
|---|
304
333 AMININKFLNQCSVSYLMNSMIPGVKRLDFDASLKDALLKYIRDNYGTLIGQVDRDKD
|---|
380
393 KVNNTLSTDIPFQLSKYVDNQ
-----
10 matches found in sequence:
aab24387 ; C. botulinum BoNT/A neurotoxin light chain prototoxin SEQ ID NO:7.
(from "bt_ags.pep")
TOIG of: aab24387 check: 3349 from: 1 to: 448
ID AAB24387 standard; protein; 448 AA.
XX
XX AAB24387;
AC
XX 15-FEB-2001 (first entry)
DT
XX
XX C. botulinum BoNT/A neurotoxin light chain prototoxin SEQ ID NO:7.
DE
XX Human; procholecystokinin; CCK A receptor; CCK B receptor; pancreatitis;
KW antiinflammatory.
KW
XX Clostridium botulinum.
OS
XX WO2000061192-A2.
PN
XX
XX 19-OCT-2000.
PD
XX
XX 06-APR-2000; 2000WO-US009142.
PF
XX
XX 08-APR-1999; 99US-00288326.
PR
XX (ALLR ) ALLERGAN SALES INC.
PA
XX Steward LE, Sachs G, Aoki KR;
XX WPI; 2000-679416/66.
XX
XX New composition for treating acute pancreatitis, comprises a pancreatic
PT cell surface marker binding element; a translocation element that
PT transfers polypeptide across vesicular membrane, and a therapeutic
PT element.
XX
XX Disclosure; Page 28; 50pp; English.
XX
XX The present invention describes a composition (I) for treating acute
CC pancreatitis. (I) comprises a first element containing a binding element
CC that binds to a pancreatic cell surface marker, a second element
CC containing a translocation element that facilitates polypeptide transfer
CC across the vesicular membrane, and a third element containing a
CC therapeutic element that inhibits enzyme secretion in pancreatic cell
CC cytoplasm. Also described is a method for making a therapeutic
CC polypeptide having a binding element selective for cholecystokinin (CCK)
CC receptor by expressing within a host cell a recombinant chimeric
CC polypeptide comprising an extein containing a therapeutic element and a
CC translocation element, and an intein located to the carboxy terminal of
CC extein having a cysteine, serine or threonine at its amino terminus, and
CC contacting the extein with a synthetic peptide comprising a CCK amino
CC acid sequence containing an amidated phenylalanine at a natural C-
```

CC a HN domain of a clostridial toxin. Polypeptides of the invention are
 CC useful for the treatment of a disease state associated with neuronal
 CC cells. The polypeptide constructs are useful for delivering therapeutic
 CC substances to neuronal cells. They are useful to treat disorders of the
 CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
 CC and infection. They are also useful in gene therapy. The present sequence
 CC is C. botulinum C2 enterotoxin translocation domain with botulinum
 CC neurotoxin type F (BoNT/F) binding domain used in the exemplification of
 CC the invention
 XX

SQ Sequence 1092 AA;

AAE07900 Length: 1092 August 31, 2004 14:39 Type: P Check: 1789 ..
 Found using 'seq23' (hayes346.key)

1 LVSFKFNSVKNKNTFTINGLNGYGFENDFFNLNIISPTLDGNTLFSKEDINSILGNKI
 16 19

61 IKSARWGL

...

81 STNSPNCRVELNGEIPNLSTNTVNLIQGNVYDIRIEQLMSENOLLKNYEGIKLYWET
 131

141 SDIIKEIIPSEVLKPNYSNTNEKSFIPNNTLFSNAKLKANANRDTDRDGPDEWEING

201 YTVMKQAVAWDDKFAANGYKKYVSNPFKPTANDPYTDFEKVSGQIDFSVSNVARDPMI
 201 220 237

261 SAYPTVGQMERLVVSKSFITITDSTKSMKSTSHSSTNINTVGAESVGSLOLAGG
 263

...

361 INPNIRYNTGTAPVNVNPTTTTIVIDKQSVATIKQESLIGDYLNPFGTPTIGEPMA
 411

421 LNTMQFSSRLIPINYNQKSIDNGGTVMLSSTQFTGNFAKYNNGNLVTDGNNWGPYLG
 436

481 TIKSTTASL

...

575 HCIIRKNMNLVKVITFKENISSINIINDTFGVQSMTGLSNRSKGQDIYRAATAPSF
 625

635 KSKELYPGRYMRFRVIOSEPFPTTMSYTNDKILLIFNKLKIKONSILDMRYENNK
 655 677

695 FIDISYGSNISINGDVYIYSTNRNQFIYSSKPSVBNQAQNDIIYNGYQNFISFVW
 745

755 RIFKYFNKVLNLEYIIDCIRNNNSGWKISLNNKIIWTLOQTAGNNOKLVNTQMIS
 769 788 809

815 ISDYINKWIFVTITNNRLNSRIYINGNLIDEKISNLGDIHVSNDNLFPKIVGCDNTRIV
 873

875 GIRYFKVFDTELKGTETIYSDPEPPSILKDFWGNLYLNKRYLLNLLRTDKSITQNS
 875

876 881 911 918
 935 NFNINQQRGVYQKPNIFSNTLYTGTVEVIIRKNGSTDISNTDNFVRKNDLAYINVDNRD
 958 987
 995 VYRLYADISIAKPEKIIKLIRTSNNSLGOIIVMDSIGNNCTMNFQNNNGGNIIGLGF
 997 1000

1055 HSNLNVASSWYNNIRKNTSSNGCFWFSFISKEHGWEN
 1066

 22 matches found in sequence:

aae07901; C. botulinum C2 translocation domain with BoNT/F-binding domain #2.
 (from "bt_ags.pep")
 TOIG of: aae07901 check: 984 from: 1 to: 1032

ID AAE07901 standard; protein; 1032 AA.

XX AC AAE07901;

XX DT 01-NOV-2001 (first entry)

XX DE C. botulinum C2 translocation domain with BoNT/F-binding domain #2.

XX KW Neuronal cell; binding domain; translocation domain; stroke; epilepsy;

XX KW tumour; infection; neurodegenerative disease; gene therapy;

XX KW botulinum neurotoxin type F; BoNT/F.

XX OS Clostridium botulinum.

XX PN WO200158936-A2.

XX PD 16-AUG-2001.

XX PF 04-DEC-2000; 2000WO-GB004644.

XX PR 02-DEC-1999; 99GB-00028530.

XX PR 07-APR-2000; 2000GB-00008658.

XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX PI Shone CC, Sutton JM, Silman N;

XX DR WPI; 2001-514643/56.

XX PT New non toxic polypeptide for delivery of a therapeutic agent for the
 treatment of a CNS disorder comprising a binding domain that translocates
 the therapeutic agent into the neuronal cells.

XX PS Example 2; Page 48; 50pp; English.

XX CC The invention relates to a non toxic polypeptide, for delivery of a
 therapeutic agent to a neuronal cell, which comprises a binding domain
 (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
 HC) that binds to the neuronal cell and a translocation domain (amino
 terminal half of HC, designated as HN), that translocates the therapeutic
 agent into the neuronal cell, where the translocation domain is not a HN
 domain of a clostridial toxin. Polypeptides of the invention are
 useful for the treatment of a disease state associated with neuronal
 cells. The polypeptide constructs are useful for delivering therapeutic
 substances to neuronal cells. They are useful to treat disorders of the
 CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
 and infection. They are also useful in gene therapy. The present sequence
 is C. botulinum C2 enterotoxin translocation domain with botulinum
 neurotoxin type F (BoNT/F) binding domain used in the exemplification of
 the invention

```
XX Sequence 1032 AA;
SQ
AAE07901 Length: 1032 August 31, 2004 14:39 Type: P Check: 984
Found using 'seq23' (hayes346.key)
1 LVSKFENVKSNKNKVTINGLMGYFENDFFNLIIISPTLDGNLTFSKEDINSILGNKI
16 19
61 IKSARWIGL
...
81 STNSPNCRVELNGEIFNLSTNTNTVNLIQGNVYDIRIEQLMSQNLKNYEGIKLYWET
131
141 SDIIKEIIPSEVLLKPNYSNTNEKSKFIPNNTLFSNAKLKANANRDTDRDGPDEWEING
201
YTMNQXAVAWDDKFAANGYKKYVSNEFFKPTCTANDPTDFEKVSGQIDPSPVSMVARDPMI
220
261 SAYPIVGVQMERLVVSKSETITGDTKSMKSTSHSSTNINTVGAESVSGSIQLAGG
263
...
361 INPNIRVYNTGAPVNVNPTTTIVIDKQSVATIKQESLIGDVLNPGVTYPIIGEPMA
411
421 LNTMDQFSSRLIPINYNQLKSIDNGTGMVLSQFTGNFAKYNNGNLVTDGNNWPGYL
436
481 TIKSTTASL
...
567 NTADKDIHMCIIKENMNLVKVITFKENISSINTMSVTNDRKILILYFNKLYKIKDKNSIL
617
627 DMRYENKFDISGYGNSINGDVYIYSTNRNQFIYSSKPSFVNIAQNNDIIYNGRYQ
685
687 NFSISFWVRIPKYNKVLNNEVYTIIDCIRNNNSGWKISLNYNKIIWTLQDTAGNQKLV
709
747 FNYTQMISIDYINKWIFVATTNNRLGNSRIYINGNLIDEKISINLGDPIHVSNDILFKIV
749
807 GCNDRYVGIRYFKVDFTELKTEIETLYSDEPDPSILKDFWGNLYLLNKRYYLLNLRIT
813 818
867 DKSITQNSFLINQGRGVQKPNIPFNTRLYTGVETIIRKNGSTDISNTDNFVRKNDLA
898
927 YINVDRDVEVRLVADISIAKPEKIIKLIRTSNNSLSLQIIIVMDSIGNNCTMNFQNNNG
937
940
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987 GNIGLLGFHSNLLVASSWYNNIRKNTSSNGCFWFSFKSKEHGWQEN
1006
```

22 matches found in sequence:

aae07902 ; C. botulinum C2 translocation domain with TeNT binding domain #1.
(from "bt_ags.pep")

TOIG of: aae07902 check: 4391 from: 1 to: 1112

ID AAE07902 standard; protein; 1112 AA.

XX AAE07902;

XX 01-NOV-2001 (first entry)

XX C. botulinum C2 translocation domain with TeNT binding domain #1.

XX Neuronal cell; binding domain; translocation domain; stroke; epilepsy;

XX tumour; infection; neurodegenerative disease; gene therapy;

XX botulinum neurotoxin; tetanus neurotoxin; TeNT.

XX Clostridium botulinum.

OS Clostridium tetani.

XX WC200158936-A2.

XX 16-AUG-2001.

XX 04-DEC-2000; 2000WO-GB004644.

XX 02-DEC-1999; 99GB-00028530.

PR 07-APR-2000; 2000GB-00008658.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX Shone CC, Sutton JM, Silman N;

XX WPI; 2001-514643/56.

XX New non toxic polypeptide for delivery of a therapeutic agent for the
PT treatment of a CNS disorder comprising a binding domain that translocates
PT the therapeutic agent into the neuronal cells.

XX Example 2; Page 49; 50pp; English.

XX The invention relates to a non toxic polypeptide, for delivery of a
CC therapeutic agent to a neuronal cell, which comprises a binding domain
CC (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
CC HC) that binds to the neuronal cell and a translocation domain (amino
CC terminal half of HC, designated as HN), that translocates the therapeutic
CC agent into the neuronal cell, where the translocation domain is not a HN
CC domain of a clostridial neurotoxin and is not a fragment or derivative of
CC a HN domain of a clostridial toxin. Polypeptides of the invention are
CC useful for the treatment of a disease state associated with neuronal
CC cells. The polypeptide constructs are useful for delivering therapeutic
CC substances to neuronal cells. They are useful to treat disorders of the
CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
CC and infection. They are also useful in gene therapy. The present sequence
CC is C. botulinum C2 enterotoxin translocation domain with tetanus
CC neurotoxin (TeNT) binding domain used in the exemplification of the
CC invention

XX Sequence 1112 AA;

AAE07902 Length: 1112 August 31, 2004 14:39 Type: P Check: 4391 ..

Found using 'seq23' (hayes346.key)

1 LVSKFENVKSNKNKVTINGLMGYFENDFFNLIIISPTLDGNLTFSKEDINSILGNKI
16 19

61 IKSARWIGL

...
81 STNSPNCRVELNGEINFNLSTNTNTVNLIQGNVYDIRIEQLMSENQLLNKYEGLKYWET 131
141 SDIIKEIIPSEVLKPNYSNTNEKSKFIPNNTLFSNAKLKANANROTDROGIDPEWEING
201 YTVNNOKAVAMDDKFAANGYKKYVSNPFKECTANDPYTDFEKVSGQIDPSVMVARDPMI 237
261 SAYPIVGQMERLVVSKSEFIITGDTKSMKSTSHSSTNINTVGAEVSGSLQLAGG 263
...
361 INPNIRYYNTGTAPVYNVTPTTIVIDKQSVATIKQGESLIGDYLNPGGTYPIIGBPPMA 411
421 LNTMDOFSSRLPIPTNQLKSIDNGGTVMLSQFTGNFAKYNNGNLVTDGNNWGPYLG 436
481 TIKSTTASL
...
575 HCLIKENMNLVXVITFKENISSINIINDTNFGVQSMGTGLSNRSKGDGIYRAATTAPSF 625
635 KSKELYPEGRYMRREVIQSEYPTFRNLCDCWDNEEDIDVILKSTILNLDINNDIISDI 655
695 SGNSSVITYPDQVLQVINGKAHLVNNESSEVIVHKAMDIEYNDMFNFTVSWFLRVP 704
755 KVSASHLEQYGTNEYSLIISMKKXHSLSIGSGWSVLKGNLNIWTLKDSAGEVQITFRDL 769
815 PDKFNAYL
...
828 FTTITNDRLLSANLYINGVLMSAEITGLGAIREDNNTLKLDRCNNNGYVSIDKPRIF 878
888 CKALNPKEIEKLYTSLSITFLRDFWGNPLRYDTEYLIIPVASSKDVQLKNTDWMYLT 900
948 NAPSYNGKLNIRYRLNYGLKFLIKRYTPNNEIDSPVKSQDFIKLYVSNNEHIVGY 961
1008 KQGNAFNNLDRILRVGNAPGIPLYKKMEAVKLRLKTYSVQLKLYDDKNASLGLVGT 1032
1068 GQIGNDPNRDILIASNMY
...

20 matches found in sequence:
aae07903 ; C. botulinum C2 translocation domain with TeNT binding domain #2.
(from "bt ags.pep")
TOIG of: aae07903 check: 7337 from: 1 to: 1052

ID AAE07903 standard; protein; 1052 AA.
XX
AC AAE07903;
XX
DT 01-NOV-2001 (first entry)
XX
DE C. botulinum C2 translocation domain with TeNT binding domain #2.
XX
KW Neuronal cell; binding domain; translocation domain; stroke; epilepsy;
KW tumour; infection; neurodegenerative disease; Gene therapy;
KW botulinum neurotoxin; tetanus neurotoxin; TeNT.
XX
OS Clostridium botulinum.
OS Clostridium tetani.
XX
PN WO200158936-A2.
XX
PD 16-AUG-2001.
XX
PF 04-DEC-2000; 2000WO-GB004644.
XX
PR 02-DEC-1999; 99GB-00028530.
PR 07-APR-2000; 2000GB-00008658.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Shone CC, Sutton JM, Silman N;
XX WPI; 2001-514643/56.
DR
XX
PT New non toxic polypeptide for delivery of a therapeutic agent for the
PT treatment of a CNS disorder comprising a binding domain that translocates
PT the therapeutic agent into the neuronal cells.
XX
PS Example 2; Page 50; 50pp; English.
XX
CC The invention relates to a non toxic polypeptide, for delivery of a
CC therapeutic agent to a neuronal cell, which comprises a binding domain
CC (carboxy terminal half of heavy chain (HC) of a neurotoxin, designated as
CC HC) that binds to the neuronal cell and a translocation domain (amino
CC terminal half of HC, designated as HN), that translocates the therapeutic
CC agent into the neuronal cell, where the translocation domain is not a HN
CC domain of a clostridial neurotoxin and is not a fragment or derivative of
CC a HN domain of a clostridial toxin. Polypeptides of the invention are
CC useful for the treatment of a disease state associated with neuronal
CC cells. The polypeptide constructs are useful for delivering therapeutic
CC substances to neuronal cells. They are useful to treat disorders of the
CC CNS including neurodegenerative diseases, stroke, epilepsy, brain tumours
CC and infection. They are also useful in gene therapy. The present sequence
CC is C. botulinum C2 enterotoxin translocation domain with tetanus
CC neurotoxin (TeNT) binding domain used in the exemplification of the
CC invention
XX
SQ Sequence 1052 AA;

AAE07903 Length: 1052 August 31, 2004 14:39 Type: P Check: 7337 ..
Found using 'seq23' (hayes346.key)

1 LVSKFENSVKNSKNKYFTINGLMGYGFENDFFNLIISPTLDGNLTFSKEDINSILGNKI
16 19
61 IKSARWIGL
...

```

81 STGPNCKVELNGEINLSNTSNTVNLQGNVDIRIEQLMSENQLLKNVEGIKLYWET |--|
131
141 SDIIEIIPSEVLLKPNVSNNTNEKSFIPNNTLPSNAKLKANANRDTDRDGPDEWEING
171 YTVNMQKAVAMDDKFAANGYKKYVSNPPKPCCTANDPYTDFEKVSGQIDPSVSMVARDPMI |--|
201 201 220 237
261 SAYPIGVQMERLVVSKSETITGDBSTKMSKSTSHSSTNINTVGAEVSGSLQLAGG |--|
263
...
361 INPNIRYNTGTPAVNVPTTTTIVIDKQSVATIKQBSLIGDYLNPGGTYPIIGEPMA |--|
411
421 LNTWDQPSRLIPINYNOLKSIDNGGTVMNSTQGTGNFAKYNNGNLVTDGNNWGPYL |--|
436
481 TIKSTTASL
...
594 NISSINKNLDWCVDNEEDIDVILKSTILNDINNDIISDIFSGFNSSVITYPDAQLVPGI |--|
644
654 NGKAIHLVNNESSEVIVHKAMDIENDMFNFTVSFWLVRPKVSASHLEOYGTNEYSLIS |--|
709
714 SMKXHSLSIGSGWSVLKGNLWTLKDSAGEVRQITPRDLPKFNAYL
...
768 FITTNRRLSSANLYINGVLMSGAEITGLGAIREDNITLKLDRNNNNQVNSDKPRIF |--|
818
828 CKALNPKEIEKLYTSLSITFLRDFWGNPLRYDTEYILPVASSSKDVOLKXNITDYWILT |--|
840 843 863 883
888 NAPTNGKLNYYRRLYNGLKFKIKRYTPNNEIDSFKVSGDFIKLYVSYNNNEHIVGYP |--|
901 905 934
948 KDGNAFNLDRLRVGNAPGIPYKMKMEAVKLRDLKTYSVQLKLYDDKNASLGIVGTHN |--|
972
1008 GQIGNDNRDILIASNWY
...
16 matches found in sequence:
aae35692 ; DipT HN domain-BoNT/F-Hc fusion construct.
(from "bt_ags.pep")
TOIG of: aae35692 check: 6299 from: 1 to: 645
ID AAE35692 standard; protein; 645 AA.
XX
AC AAE35692;

```

```

XX |--|
DT DT
XX 23-OCT-2003 (revised)
XX 17-JUN-2003 (first entry)
XX
DE DiPT HN domain-BoNT/F-Hc fusion construct.
XX
XX Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
XX infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
XX muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
XX torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
XX translocation domain; HN domain; DiPT; Hc; botulinum type F neurotoxin;
XX binding domain; BoNT/F.
XX
XX Corynebacterium diphtheriae.
XX OS
XX Clostridium botulinum.
XX OS
XX Chimeric.
XX
XX WO200296467-A2.
XX
XX 05-DEC-2002.
XX
XX 21-MAY-2002; 2002WO-GB002384.
XX
XX 24-MAY-2001; 2001GB-00012687.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX Sutton JM, Shone CC;
XX
XX WPI; 2003-167247/16.
XX
XX Conjugate for modulating cell survival and cell growth, modulating
XX release of inflammatory mediator from cells, comprises injected bacterial
XX effector protein and a carrier that targets the protein to target cell.
XX
XX Example 12; Page 57-60; 130pp; English.
XX
XX The invention relates to a conjugate comprising an injected bacterial
XX effector protein and a carrier that targets the effector protein to a
XX target cell. Pharmaceutical composition of the invention is useful for a
XX treating selected from promoting or inhibiting survival of cells;
XX preventing and reversing damage to cells; killing cells; promoting or
XX inhibiting the growth of cells; apoptosis, release of an inflammatory
XX mediator from cells, division of cells and treating intracellular
XX infection and regulating nitric oxide release from cells. The invention
XX is useful in the manufacture of a medicament for treating a neuronal
XX cell, for intracellular infection, for interfering with intracellular
XX trafficking, for modulating expression of cell-surface markers and for
XX inhibiting secretion from cells. The invention is also useful for
XX treating Prion disease, Alzheimer' disease and wide range of disorders
XX including muscle spasms such as blepharospasm, torticollis and
XX hypersecretion disorders such as chronic obstructive pulmonary disease
XX (COPD), bronchitis and asthma. The present sequence is a fusion construct
XX comprising Corynebacterium diphtheriae diphtheria toxin translocation
XX domain (Dip-HN domain) and botulinum type F neurotoxin from Clostridium
XX botulinum. This sequence is used in the exemplification of the invention.
XX (Updated on 23-OCT-2003 to standardise OS field)
XX
XX Sequence 645 AA;
XX
AAE35692 Length: 645 August 31, 2004 14:39 Type: P Check: 6299 ..
Found using 'seq23' (hayes346.key)
...
37 NKMSESPNKTVSEKAKQYLEEFHQTALEHPELSELKTVTGTNPFAGANYAANVNAQ |--|
87 90
97 VIDSETADNLEKTTAALSILPGIGSVMGADGAVHHNTEIIVAQSIALLSLMVAQIPLV
157 |--|
GELVDIGFAYNFVESINLFPQVHNNSYNRPAYSPGHKTPQFLHDGYAVSWNTVRSTWSY

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167
217  TNDKILILYFNKLYKKIKDNSILDMRYENNKFDISGYGSNISINGDVVIYSTNRNQFGI
230
277  YSKSPSEVNIAQNNDIINYGRYONFSISFWVRIPKYFNKVNILNNBYTIIIDCIRNNNSGWK
298
337  ISLNNKLIITWLQDTAGNKKLVFNNTQMSISDYINKWIFVTITNNRLGNSRIYINGNL
341
397  IDEKISNLGDIHVSNDILFKIVGNCNDRYVGIRPKVFDTELKTEIETLYSDEPDPSI
426 431
457  LKDFWGNLYLLNKKRYLLENLLRTRDKSITQNSNLFNINQORGVYQKPNIFSNTRLYTGVV
464 471
517  IIRKNGSTDISNTDNFVRKNDLAYINVDVDEYRLYADISIAKPEKIKLIRTSNNS
540 550
577  LQGIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWFSFI
619
637  SKEHGQEN

-----
16 matches found in sequence:
aae35693 ; BoNT/F-Hc-DiP1 HN domain-thrombin linker fusion construct.
(from "bt_ags.pep")
TOIG of: aae35693 check: 9385 from: 1 to: 657

ID AAE35693 standard; protein; 657 AA.
XX AC AAE35693;
XX DT 17-JUN-2003 (first entry)
XX DE BoNT/F-Hc-DiP1 HN domain-thrombin linker fusion construct.
XX KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
XX KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
XX KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
XX KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
XX KW BoNT/F; translocation domain; HN domain; DiP1; Hc; binding domain;
XX KW botulinum type F neurotoxin.
XX OS Corynebacterium diphtheriae.
XX OS Clostridium botulinum.
XX OS Unidentified.
XX OS Chimeric.
XX PN WO200296467-A2.
XX XX
XX PD 05-DEC-2002.
XX XX
XX PF 21-MAY-2002; 2002WO-GB002384.
XX XX
XX PR 24-MAY-2001; 2001GB-00012687.
XX XX
XX PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX XX
XX PI Sutton JM, Shone CC;
XX XX
XX WPI; 2003-167247/16.

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Conjugate for modulating cell survival and cell growth, modulating release of inflammatory mediator from cells, comprises injected bacterial effector protein and a carrier that targets the protein to target cell.

Example 12; Page 60-63; 130pp; English.

The invention relates to a conjugate comprising an injected bacterial effector protein and a carrier that targets the effector protein to a target cell. Pharmaceutical composition of the invention is useful for a treatment selected from promoting or inhibiting survival of cells; preventing and reversing damage to cells; killing cells; promoting or inhibiting the growth of cells, apoptosis, release of an inflammatory mediator from cells, division of cells and treating intracellular infection and regulating nitric oxide release from cells. The invention is useful in the manufacture of a medicament for treating a neuronal cell, for intracellular infection, for interfering with intracellular trafficking, for modulating expression of cell-surface markers and for inhibiting secretion from cells. The invention is also useful for treating Prion disease, Alzheimer' disease and wide range of disorders including muscle spasms such as blepharospasm, torticollis and hypersecretion disorders such as chronic obstructive pulmonary disease (COPD), bronchitis and asthma. The present sequence is a fusion construct comprising Corynebacterium diphtheriae diphtheria toxin translocation domain (DiP1/F-Hc) from Clostridium botulinum and thrombin linker peptide. This sequence is used in the exemplification of the invention

Sequence 657 AA;

AAE35693 Length: 657 August 31, 2004 14:39 Type: P Check: 9385
Found using 'seq23' (hayes346.key)

...

49 NKMSBPNTVSEKAKOYLEBPHQTALEHPELSELKVTGTNPVAGNYAAAWYVNAQ
99 102

109 VIDSETADNLEKTTAALSILPGIGSVMIADGAVHHTETEEIVAQSIALSSLMVAQAIPLV

169 GELVDIGFAAYNFVESILNLFQVHNSYNRPAYSPGHKTQPFHLDGAVSWNTVTRTMSY
179

229 TNDKILILYFNKLYKKIKDNSILDMRYENNKFDISGYGSNISINGDVVIYSTNRNQFGI
242

289 YSKSPSEVNIAQNNDIINYGRYONFSISFWVRIPKYFNKVNILNNBYTIIIDCIRNNNSGWK
310 334

349 ISLNNKLIITWLQDTAGNKKLVFNNTQMSISDYINKWIFVTITNNRLGNSRIYINGNL
353 374

409 IDEKISNLGDIHVSNDILFKIVGNCNDRYVGIRPKVFDTELKTEIETLYSDEPDPSI
438 443

469 LKDFWGNLYLLNKKRYLLENLLRTRDKSITQNSNLFNINQORGVYQKPNIFSNTRLYTGVV
476 483

529 IIRKNGSTDISNTDNFVRKNDLAYINVDVDEYRLYADISIAKPEKIKLIRTSNNS
552 565

589 LQGIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWFSFI

631

649 SKEHGWOEN

 16 matches found in sequence:
 aae35694 ; BONT/F-Hc-Dipt HN domain-factor Xa linker fusion construct.
 (from "bt ags.pep")
 TOIG of: aae35694 check: 9121 from: 1 to: 657

ID AAE35694 standard; protein; 657 AA.
 AC AAE35694;
 XX
 XX
 DT 17-JUN-2003 (first entry)
 XX
 XX BONT/F-Hc-Dipt HN domain-factor Xa linker fusion construct.
 XX
 KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
 KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
 KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
 KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
 KW BONT/F; translocation domain; HN domain; Dipt; Hc; binding domain;
 KW botulinum type F neurotoxin.
 XX
 OS Corynebacterium diphtheriae.
 OS Clostridium botulinum.
 OS Unidentified.
 OS Chimeric.
 XX
 PN WO200296467-A2.
 XX
 XX 05-DEC-2002.
 XX
 XX 21-MAY-2002; 2002WO-GB002384.
 XX
 XX 24-MAY-2001; 2001GB-00012687.
 PR
 XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 XX
 XX Sutton JM, Shone CC;
 XX
 XX WI; 2003-167247/16.
 XX
 XX Conjugate for modulating cell survival and cell growth, modulating
 PT release of inflammatory mediator from cells, comprises injected bacterial
 PT effector protein and a carrier that targets the protein to target cell.
 XX
 XX Example 12; Page 63-65; 130pp; English.

CC The invention relates to a conjugate comprising an injected bacterial
 CC effector protein and a carrier that targets the effector protein to a
 CC target cell. Pharmaceutical composition of the invention is useful for a
 CC treatment selected from promoting or inhibiting survival of cells;
 CC preventing and reversing damage to cells; killing cells; promoting or
 CC inhibiting the growth of cells; apoptosis, release of an inflammatory
 CC mediator from cells, division of cells and treating intracellular
 CC infection and regulating nitric oxide release from cells. The invention
 CC is useful in the manufacture of a medicament for treating a neuronal
 CC cell, for intracellular infection, for interfering with intracellular
 CC trafficking, for modulating expression of cell-surface markers and for
 CC inhibiting secretion from cells. The invention is also useful for
 CC treating Prion disease, Alzheimer' disease and wide range of disorders
 CC including muscle spasms such as blepharospasm, torticollis and
 CC hypersecretion disorders such as chronic obstructive pulmonary disease
 CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
 CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
 CC domain (Dipt-HN domain), botulinum type F neurotoxin binding domain
 CC (BONT/F-Hc) from Clostridium botulinum and factor Xa linker peptide. This
 CC sequence is used in the exemplification of the invention

XX
 SQ Sequence 657 AA;

AAE35694 Length: 657 August 31, 2004 14:39 Type: P Check: 9121
 Found using 'seq23' (hayes346.key)

...

49 NKMSEPNKTVSEKAKQYLEEFHQTALEHPELSELKTVGTGPNVFAGANYAAAVNVAQ
 99 102
 109 VIDSETADNLEKTTAALSILPGIGSVMGADGAVHHNTEEIVASIALSSLMVAQAPLV
 169 GELVDIGFAAYNFVESIINLFQVVHNSYNRPAYSPGHKTQPFLLHDGYAVSWNTVRSTMSY
 179
 229 TNDKILILYFNKLYKKIKDINSILDMRYENKFFIDISGYGSNISINGDVYIYSTNRNQFGI
 242
 289 YSSKPSVNIQAQNDIIYNGRYQNFISFWVRIPKYFNKYNLNNEYTIIDCIRNNNSGWK
 310 334
 349 ISLNNKIIIMTLQDTAGNNQKLVFNVTQMISIDSYINKWIEFTITNNRLGNSRIYINGNL
 353 374
 409 IDEKISNLGDIHVSDNLFKIVGNCNDRYVGYRKYFVFDTELKTEIETLYSDEPDPSI
 438 443
 469 LKDFMGNYLLYNNKEYVILLNLLRTDKSITQNSNLFNINQORGVQKPNIFSNTLYTGVGV
 476 483
 529 IIRKNGSTDISNTDNFVRKNDLAYINVVDRDVEYRLVADISIAKPEKIKLIRTSNSNS
 532 552 565
 589 LGQIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWFSFI
 631
 649 SKEHGWOEN

 18 matches found in sequence:
 aae35710 ; BONT/F-Hc-Dipt HN domain-thrombin-linker SigD protein fusion constr
 (from "bt ags.pep")
 TOIG of: aae35710 check: 7092 from: 1 to: 1192

ID AAE35710 standard; protein; 1192 AA.
 XX
 AC AAE35710;
 XX
 XX 17-JUN-2003 (first entry)
 DT
 XX BONT/F-Hc-Dipt HN domain-thrombin-linker SigD protein fusion construct.
 DE
 XX Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
 KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
 KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
 KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
 KW BONT/F; translocation domain; HN domain; Dipt; Hc; binding domain;
 KW botulinum type F neurotoxin; invasion gene D protein; SigD protein.
 XX
 OS Corynebacterium diphtheriae.
 OS Clostridium botulinum.
 OS Salmonella typhimurium.
 OS Unidentified.
 OS Chimeric.

XX
PN WO200296467-A2.
XX
PD 05-DEC-2002.
XX
PF 21-MAY-2002; 2002WO-GB002384.
XX
XX 24-MAY-2001; 2001GB-00012687.
PR
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PA Sutton JM, Shone CC;
XX WPI; 2003-167247/16.
DR
XX
XX Conjugate for modulating cell survival and cell growth, modulating
PT release of inflammatory mediator from cells, comprises injected bacterial
PT effector protein and a carrier that targets the protein to target cell.
XX
PS Example 12; Page 97-101; 130pp; English.
XX
CC The invention relates to a conjugate comprising an injected bacterial
CC effector protein and a carrier that targets the effector protein to a
CC target cell. Pharmaceutical composition of the invention is useful for a
CC treatment selected from promoting or inhibiting survival of cells;
CC preventing and reversing damage to cells; killing cells; promoting or
CC inhibiting the growth of cells, apoptosis, release of an inflammatory
CC mediator from cells, division of cells and treating intracellular
CC infection and regulating nitric oxide release from cells. The invention
CC is useful in the manufacture of a medicament for treating a neuronal
CC cell, for intracellular infection, for interfering with intracellular
CC trafficking, for modulating expression of cell-surface markers and for
CC inhibiting secretion from cells. The invention is also useful for
CC treating Prion disease, Alzheimer' disease and wide range of disorders
CC including muscle spasms such as blepharospasm, torticollis and
CC hypersecretion disorders such as chronic obstructive pulmonary disease
CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
CC (BoNT/F-Hc) from Clostridium botulinum and thrombin linker peptide and
CC Salmonella typhimurium truncated invasion gene D protein, SigD. This
CC sequence is used in the exemplification of the invention
XX
SQ Sequence 1192 AA;
AAE35710 Length: 1192 August 31, 2004 14:39 Type: P Check: 7092 ..
Found using 'seq23' (hayes346.key)
...
336 NELALKLGFGLKASDSYNABALHQLLGNLDRPEARPGWGWGEVLAQYPDNYEVNTLARQ
413
396 IKDIWKNNQHKDGEPYKLAQLAMLAHEIDAVPAWNCCKGKDRGTGMDSEIKGEIISL
413
456 HQTHMLSAFGS
...
584 NKMSBPNKTVSEKAKYLEEPHQTALHEPSELKTVTGTNPVPFAGANYAAWVNAQ
634
644 VIDSETADNLEKTAALSILPGTGSVMGIADGAVHHTHEIQAQSLSLMVAQAIPLV
704 GELVDIGFAAYNFVESIINLFQVYHNSYNRSAYSPGHKTQPFILHDGYAVSWNTVRSTMSY
714

764 TNDKILLYFNKLYKKIKDINSILDMMRYENNNKFIDISGYGNSINGDVYIYSTRNQFGI
777
824 YSSKPSEVNIAQNNDIYNGRYCNFSISFWVRIPKYFNKVNLNNEVTIIDCIRNNNSGWK
845
884 ISLNYNKKIITWLTQDTAGNOKLVFNFTQMSISDYINKWIFVVTITNRLGNSRIYINGNL
888
944 IDEKSISNLGDIHVSNDILFKIVGCDTRYGIRFKVFDTELKTEIETLYSDPEPDSI
973 978
1004 LKDFWGNLYLLNKKRYLLMLLRLLTDSITQNSFLNQGVYQKPNFNTFLYTGVEV
1011 1018
1064 IIRKNGSTDISNTDNFVRKNDLAYINVDVDRDVEYRLYADISIAKPEKIIKLIRTSNNS
1087 1097 1100
1124 LGQIIVMDSIGNCTMNFQNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFWSEI
1166
1184 SKEHGWQEN

18 matches found in sequence:
aae35711 ; BoNT/F-Hc-DipT HN domain-factor Xa-linker SigD protein fusion const
(from "bt_ags.pep")
TOIG of: aae35711 check: 5992 from: 1 to: 1192
ID AAE35711 standard; protein; 1192 AA.
XX
AC AAE35711;
XX
DT 17-JUN-2003 (first entry)
XX
DE BoNT/F-Hc-DipT HN domain-factor Xa-linker SigD protein fusion construct.
XX
KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
KW BoNT/F; translocation domain; HN domain; DipT; Hc; binding domain;
KW botulinum type F neurotoxin; invasion gene D protein; SigD protein.
XX
OS Corynebacterium diphtheriae.
OS Clostridium botulinum.
OS Salmonella typhimurium.
OS Unidentified.
OS Chimeric.
XX
PN WO200296467-A2.
XX
PD 05-DEC-2002.
XX
PF 21-MAY-2002; 2002WO-GB002384.
XX
PR 24-MAY-2001; 2001GB-00012687.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Sutton JM, Shone CC;
XX WPI; 2003-167247/16.
DR
XX
XX Conjugate for modulating cell survival and cell growth, modulating

PT release of inflammatory mediator from cells, comprises injected bacterial
PT effector protein and a carrier that targets the protein to target cell.
XX
PS Example 12; Page 101-106; 130pp; English.

XX The invention relates to a conjugate comprising an injected bacterial
CC effector protein and a carrier that targets the effector protein to a
CC target cell. Pharmaceutical composition of the invention is useful for a
CC treatment selected from promoting or inhibiting survival of cells;
CC preventing and reversing damage to cells; killing cells; promoting or
CC inhibiting the growth of cells; apoptosis, release of an inflammatory
CC mediator from cells, division of cells and treating intracellular
CC infection and regulating nitric oxide release from cells. The invention
CC is useful in the manufacture of a medicament for treating a neuronal
CC cell, for intracellular infection, for interfering with intracellular
CC trafficking, for modulating expression of cell-surface markers and for
CC inhibiting secretion from cells. The invention is also useful for
CC treating Prion disease, Alzheimer's disease and wide range of disorders
CC including muscle spasms such as blepharospasm, torticollis and
CC hypersecretion disorders such as chronic obstructive pulmonary disease
CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
CC (BoNT/F-Hc) from Clostridium botulinum and factor Xa linker peptide and
CC Salmonella typhimurium invasion gene D protein, SigD. This sequence is
CC used in the exemplification of the invention

XX Sequence 1192 Aa;

AAE35711 Length: 1192 August 31, 2004 14:39 Type: P Check: 5992 ..
Found using 'seq23' (hayes346.key)

...

336 NELALKLGFLKASDSYNAAELHOLLGNLDRPEARPGWGWEWLAQYPDNVVNTLARIQ
386

396 IKDIWKNNQHHKGGEPYKLAQRLAMLAHEIDAVPANCKSGKDRGTGMWDSIKGEIISL
413

456 HQTHLSAPGS

...

584 NKMSSEPNKTVSEKAKOYLEEFHQTALEHPSELKTVTGTNPVFAGANYAAVAVNVAQ
634

644 VIDSETADNLEKTTAALSILPGISVMGIADGAVHNTTEIVAQSIALSLWVAQATPLV

704 GELVDIGFAYNFVESINLFPQVHNSYNRSAYSFGHKTQPFLLHDGYAVSWNTVRSTMSY
714

764 TNDKILILYFNKLYKKIKNSILDWRYENKFKFIDISGYGSINISGDVYIYSTNRNQFI
777

824 YSSKPEVNIQAQNDIIYNGRYQNPISFWVRIPKYNKVNLNNEYTIIDICIRNNSGWK
845

884 ISLWYKLIWTLDQTAGNKKQLVFNVTQMISDYNKWIPIVTTNNRLGNSRIYINGNL
888

944 IDEKSINLGDHVSNDNLFKIVGNCNDRYGVYFKVFDTELKGTETETLYSDPDPSI
973 978

---|---|---|---|

1004 LKDFWGNLYLNKRYLLNLLRTDKSITONSFLNQQRGVYQKPNIFSNRLTYGTVEV
1011 1018 1058

1064 IIRKNGSTDISNTDNFVRKNDLAYINVVDREYRLYADISIAKPEKIIKLIRTSNNSNS
1087 1097 1100

1124 LGQIIVMDSIGNCTMNFQNNNGNIGLLGFHSNVLVASSWYNNIRKNTSSNGCFWSFI
1166

1184 SKHEGWQEN

18 matches found in sequence:
aae35713 ; BoNT/F-Hc-DipT HN domain-factor Xa linker-YopT protein const
(from "bt_ags.pep")

TOIG of: aae35713 check: 67 from: 1 to: 979

ID AAE35713 standard; protein; 979 AA.

XX AAE35713;

XX 17-JUN-2003 (first entry)

XX BoNT/F-Hc-DipT HN domain-factor Xa linker-YopT protein fusion construct.

XX Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW torticollis; blepharospasm; asthma; fusion protein; diphtheria toxin;
KW BoNT/F; translocation domain; HN domain; DipT; Hc; binding domain;
KW botulinum type F neurotoxin; targetted effector protien; YopT.

XX Corynebacterium diphtheriae.

OS Clostridium botulinum.

OS Yersinia pestis.

OS Unidentified.

OS Chimeric.

XX WO200296467-A2.

XX 05-DEC-2002.

XX 21-MAY-2002; 2002WO-GB002384.

XX 24-MAY-2001; 2001GB-00012687.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX Sutton JM, Shone CC;

XX WPI; 2003-167247/16.

XX Conjugate for modulating cell survival and cell growth, modulating
PT release of inflammatory mediator from cells, comprises injected bacterial
PT effector protein and a carrier that targets the protein to target cell.

XX Example 12; Page 110-114; 130pp; English.

XX The invention relates to a conjugate comprising an injected bacterial
CC effector protein and a carrier that targets the effector protein to a
CC target cell. Pharmaceutical composition of the invention is useful for a
CC treatment selected from promoting or inhibiting survival of cells;
CC preventing and reversing damage to cells; killing cells; promoting or
CC inhibiting the growth of cells; apoptosis, release of an inflammatory
CC mediator from cells, division of cells and treating intracellular
CC infection and regulating nitric oxide release from cells. The invention
CC is useful in the manufacture of a medicament for treating a neuronal
CC cell, for intracellular infection, for interfering with intracellular
CC trafficking, for modulating expression of cell-surface markers and for

CC inhibiting secretion from cells. The invention is also useful for
CC treating Prion disease, Alzheimer' disease and wide range of disorders
CC including muscle spasms such as blepharospasm, torticollis and
CC hypersecretion disorders such as chronic obstructive pulmonary disease
CC (COPD), bronchitis and asthma. The present sequence is a fusion construct
CC comprising Corynebacterium diphtheriae diphtheria toxin translocation
CC domain (DipT-HN domain), botulinum type F neurotoxin binding domain
CC (BoNT/F-Hc) from Clostridium botulinum and factor Xa linker peptide and
CC Yersinia pestis targetted effector protein Yopt. This sequence is used in
CC the exemplification of the invention
XX
XX Sequence 979 AA;
SQ

AAE35713 Length: 979 August 31, 2004 14:39 Type: P Check: 67 ..
Found using 'seq23' (hayes346.key)

...
38 VETALSHNLQKLSATIKHNQSGRSMRLDKLTS D G K A N Q R S F T F S M I Y R M I H F V L S T
88 91

98 RVPVAVRESVANYGNINFKFAQT K G A F L H K I I K H S D T A S G V C E A

...
196 LDMFKNGISERMIEHCLLRPVDVTGTTSEGLQLLNAILDTHGIGYKKIHLGGQM
246

256 SAHAIAAYVNEKSGVTFFDPNFCPEHFSDEKFKRWFTNSFWCN

...
371 NKWRSBPNKTVSEKAKQYLEBFHQTALEHPSELKLTVTGTPNVPFAGANYAAWVNVQA
421

431 VIDSETADNLEKTTAALSILPGIGSVMIADGAVHNTETIEVAQSIALSSLMVAQAIPLV

491 GELVDIGFAAYNFVESIINLFQVHNSYNSAVSPGHKTQPFPLHDGAVYSWNTVRSMTSV
501

551 TNDKILILYFNKLYKKIKONSLDMRYENKKNFIDISGYGNSINGDVVIYSTNRNQPGI
564

611 YSSKPSVNIQONNDIYNGRYQNFISFWVRIPKPYFNKVNLLNNEYTIIDCIRNNNSGHWK
632 656

671 ISLNNKIIITLQDTAGNQKLVFNVTOMISISDYINKWIFVTITNNRLNSRIYINGNL
675 696

731 IDEKISINLGDHIVSDNILLKIVGCDNTRYGIRYFKYFDTGLGKTEIETLXSDEPDPSI
760 765

791 LKDFWGNLYLKNRYVLLMLLRDTSITONSFNINQORGVYQKPNIFSNTKLYTGVEV
798 805 845

851 IIRKNGSTDISNTDFVRKNDLAYINVDVDEYRLYADISIAKPKIIXLRTSNNNS
874 884 887

911 LQGIIVMDSIGNCTMNFQNNNGNIGLLGFHSHNLLVASSWYNNIRKNTSSNGCFWSEFI
953

971 SXEHGWQEN

7 matches found in sequence:

aae35718 ; Clostridium botulinum C2 toxin component 1.

(from "Bt_ags.pep")

TOIG of: aae35718 check: 9343 from: 1 to: 431

ID AAE35718 standard; protein; 431 AA.

XX

AC AAE35718;

XX

DT 17-JUN-2003 (first entry)

XX

DE Clostridium botulinum C2 toxin component 1.

XX

KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;

KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;

KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;

KW torticollis; blepharospasm; asthma; C2 toxin.

XX

OS Clostridium botulinum.

XX

PN WO200296467-A2.

XX

PD 05-DEC-2002.

XX

PF 21-MAY-2002; 2002WO-GB002384.

XX

PR 24-MAY-2001; 2001GB-00012687.

XX

PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX

PI Sutton JM, Shone CC;

XX

DR WPI; 2003-167247/16.

XX

PT Conjugate for modulating cell survival and cell growth, modulating
PT release of inflammatory mediator from cells, comprises injected bacterial
PT effector protein and a carrier that targets the protein to target cell.

XX

PS Example 12; Page 125-127; 130pp; English.

XX

CC The invention relates to a conjugate comprising an injected bacterial
CC effector protein and a carrier that targets the effector protein to a
CC target cell. Pharmaceutical composition of the invention is useful for a
CC treatment selected from promoting or inhibiting survival of cells;
CC preventing and reversing damage to cells; killing cells; promoting or
CC inhibiting the growth of cells; apoptosis, release of an inflammatory
CC mediator from cells, division of cells and treating intracellular
CC infection and regulating nitric oxide release from cells. The invention
CC is useful in the manufacture of a medicament for treating a neuronal
CC cell, for intracellular infection, for interfering with intracellular
CC trafficking, for modulating expression of cell-surface markers and for
CC inhibiting secretion from cells. The invention is also useful for
CC treating Prion disease, Alzheimer' disease and wide range of disorders
CC including muscle spasms such as blepharospasm, torticollis and
CC hypersecretion disorders such as chronic obstructive pulmonary disease
CC (COPD), bronchitis and asthma. The present sequence is Clostridium
CC botulinum C2 toxin component 1. This sequence is used in the
CC exemplification of the invention

XX Sequence 431 AA;

AAE35718 Length: 431 August 31, 2004 14:39 Type: P Check: 9343 ..

Found using 'seq23' (hayes346.key)

...

51 TKIDNPFSTDLFSSLTATIMKEDENQNLFDYERIREALLKNTLDREVIGNVFTPKELG
101

```

111  INFSDVELNRDISDEILDKVRQIIINQETKTSFVSLGLNDSIDESIPVIVKTRVPT
141  |--|
171  TFNGVLLNNKETVSLLLNQFSIIPESAIITIKGQYVILIEGSLSQELDFYKGSBAWG
174  |--|
208  |--|
231  EKNYGDVSKLSQEQALGEGYLHSDYKAINSLYLRNRRVPPNDELNKKIELISSALSVKP
234  |--|
257  |--|
291  IPETLIAVRRVDGIPFDLPDSFDDKENGFEIIADTKLNEFIDKWTKETENLSPSSTS
298  |--|
351  L
...
12 matches found in sequence:
aae35719 ; Clostridium botulinum C2 toxin component 2.
(from "bt.ags.pep")
TOIG of: aae35719 check: 3459 from: 1 to: 721

ID AAE35719 standard; protein; 721 AA.
XX
AC AAE35719;
XX
DT 17-JUN-2003 (first entry)
XX
DE Clostridium botulinum C2 toxin component 2.
XX
KW Apoptosis; therapy; inflammatory mediator; intracellular trafficking;
KW infection; Prion disease; Alzheimer' disease; hypersecretion disorder;
KW muscle spasm; COPD; bronchitis; chronic obstructive pulmonary disease;
KW torticollis; blephorospasm; asthma; C2 toxin.
XX
OS Clostridium botulinum.
XX
PN WO200296467-A2.
XX
PD 05-DEC-2002.
XX
PF 21-MAY-2002; 2002WO-GB002384.
XX
PR 24-MAY-2001; 2001GB-00012687.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Sutton JM, Shone CC;
XX
DR WPI; 2003-167247/16.
XX
PT Conjugate for modulating cell survival and cell growth, modulating
PT release of inflammatory mediator from cells, comprises injected bacterial
PT effector protein and a carrier that targets the protein to target cell.
XX
PS Example 12; Page 127-130; 130pp; English.
XX
CC The invention relates to a conjugate comprising an injected bacterial
CC effector protein and a carrier that targets the effector protein to a
CC target cell. Pharmaceutical composition of the invention is useful for a
CC treatment selected from promoting or inhibiting survival of cells;
CC preventing and reversing damage to cells; killing cells; promoting or
CC inhibiting the growth of cells; apoptosis, release of an inflammatory
CC mediator from cells, division of cells and treating intracellular
CC infection and regulating nitric oxide release from cells. The invention
CC is useful in the manufacture of a medicament for treating a neuronal
CC cell, for intracellular infection, for interfering with intracellular
CC trafficking, for modulating expression of cell-surface markers and for

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CC inhibiting secretion from cells. The invention is also useful for
CC treating Prion disease, Alzheimer' disease and wide range of disorders
CC including muscle spasms such as blephorospasm, torticollis and
CC hypersecretion disorders such as chronic obstructive pulmonary disease
CC (COPD), bronchitis and asthma. The present sequence is Clostridium
CC botulinum C2 toxin component 2. This sequence is used in the
CC exemplification of the invention
XX
SQ Sequence 721 AA;
AAE35719 Length: 721 August 31, 2004 14:39 Type: P Check: 3459
Found using 'seq23' (hayes346.key)
1 MLVSKFENSVKSNKNYFTINGLMGYFENDFFNLIISPTLDGNLTFSEKEDINSILNGK
17 20
61 IIKSARWIGL
...
82 STNSPNCRVELNGEINFNLSTNTVNLIQNVYDIRIEQLMSENQLLNKTEGKLYWET
132 |--|
142 SDIIKEIIPSEVLLKPNYSNTNEKSKFIPNNTLFSSNAKLKANANRDTDRDGPDEWEING
|--|
202 YTVNQKAVAWDDKFAANGYKYSNPFKPCPTANDPYTDFEKGQIDPSVSMVARDPMI
238 |--|
262 SAYPIGVQMERLVVSKSEITIGDSTKMSKSTSHSSTNINTVGAEVSGSLQLAGG
264 |--|
...
362 INPNIRYNTGTAPVNVVPTTTIVIDKQSVATIKQESLIGDYLNPQGTYPPIIPEPMA
412 |--|
422 LNTWQFSSRLIPINYNQLKSIDNGGTVMLSQTGTFKYNKNGNLVTDGNNWGPYLG
437 |--|
482 TIKSTTASL
...
576 HCLIKRNNMILVKVITFKENISSINIINDTNFVGQSMTGLSNRSKGGODGIYRAATAPSF
626 |--|
636 KSKELKYPEGRYMRFRVIQSEYEPFTCNFKLNNLIYSSSFDKGYDEFFFYNGSKSFF
656 |--|
680 |--|
696 NISCDIINSNRLSGVFLIEDKLII
696 |--|
4 matches found in sequence:
aag79295 ; Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
(from "bt.ags.pep")
TOIG of: aag79295 check: 6413 from: 1 to: 207
ID AAG79295 standard; protein; 207 AA.
XX
AC AAG79295;
XX
DT 03-JAN-2002 (first entry)
XX
DE Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
XX

```



```

KW Neurotoxin; BoNT; vaccine; botulism.
XX Clostridium botulinum.
XX US6287566-B1.
XX 11-SEP-2001.
XX 19-MAY-1995; 95US-00446114.
XX 19-MAY-1995; 95US-00446114.
XX (USSA ) US SEC OF ARMY.
XX Dertzbaugh MT;
XX WPI; 2001-615462/71.
XX New protective epitopes of neurotoxin of Clostridium botulinum, useful
XX for developing vaccines against neurotoxins of Clostridium botulinum and
XX for identifying protective antibodies.
XX Claim 1; Col 25; 14pp; English.
XX The present sequence represents a fragment of the Clostridium botulinum
XX neurotoxin (BoNT). It was produced by amplifying overlapping fragments of
XX the BoNT gene. The amplified fragments were cloned expressed to identify
XX immunogenic polypeptides which are capable of giving rise to protective
XX antibodies. The BoNT polypeptide fragment are useful as vaccines, for
XX immunizing against botulism, and as diagnostic agents to identify
XX protective antibodies
XX Sequence 207 AA;
AAG79295 Length: 207 August 31, 2004 14:39 Type: P Check: 6413 ..
Found using 'seq23' (hayes346.key)
1 IKVNNWDLFFSPEDNTNDLNKGEEITSDTNEAAEENISLDLIQQYLYLTNFNDPEN
121 ALLNPSRVTFSSDYVKKVKRATEAAMFLGWVQLVYDFTDETSEVSTDKIADITIII
181 PY
...
-----
2 matches found in sequence:
aag79296 ; Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
(from "bt_ags.pep")
TOIG of: aag79296 check: 7897 from: 1 to: 140
ID AAG79296 standard; protein; 140 AA.
XX AAG79296;
XX 03-JAN-2002 (first entry)
XX Amino acid sequence of botulinum neurotoxin (BoNT) fragment.
XX Neurotoxin; BoNT; vaccine; botulism.
XX Clostridium botulinum.
XX US6287566-B1.
XX

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PD 11-SEP-2001.
XX 19-MAY-1995; 95US-00446114.
XX 19-MAY-1995; 95US-00446114.
XX (USSA ) US SEC OF ARMY.
XX Dertzbaugh MT;
XX WPI; 2001-615462/71.
XX New protective epitopes of neurotoxin of Clostridium botulinum, useful
XX for developing vaccines against neurotoxins of Clostridium botulinum and
XX for identifying protective antibodies.
XX Claim 1; Col 25; 14pp; English.
XX The present sequence represents a fragment of the Clostridium botulinum
XX neurotoxin (BoNT). It was produced by amplifying overlapping fragments of
XX the BoNT gene. The amplified fragments were cloned expressed to identify
XX immunogenic polypeptides which are capable of giving rise to protective
XX antibodies. The BoNT polypeptide fragment are useful as vaccines, for
XX immunizing against botulism, and as diagnostic agents to identify
XX protective antibodies
XX Sequence 140 AA;
AAG79296 Length: 140 August 31, 2004 14:39 Type: P Check: 7897 ..
Found using 'seq23' (hayes346.key)
1 LNSSLYRGTKFTIKKYASGNKDNIVRNDRVYINVVVKNKERYLATNASQAGVEKILSAL
61 EIPDVGNLSQVVVMKSKNDQGITNKCKMNLQDNNG
...
-----
30 matches found in sequence:
aag95010 ; C. botulinum type A neurotoxin.
(from "bt_ags.pep")
TOIG of: aag95010 check: 7671 from: 1 to: 1296
ID AAR95010 standard; protein; 1296 AA.
XX AAR95010;
XX 09-JUL-1996 (first entry)
XX C. botulinum type A neurotoxin.
XX Toxin; neurotoxin; fusion protein; antitoxin; vaccine; immunogen.
XX Clostridium botulinum.
XX WO9612802-A1.
XX 02-MAY-1996.
XX 23-OCT-1995; 95WO-US013737.
XX 24-OCT-1994; 94US-00329154.
XX 16-MAR-1995; 95US-00405496.
XX 14-APR-1995; 95US-00422711.
XX 07-JUN-1995; 95US-00480604.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Padiye NV, Kink JA, Thalley BS, Stafford DC;
XX Firea JR;
XX

```

DR WPI; 1996-230603/23.
 DR N-PSDB; AAT29244.
 XX Fusion proteins comprising non-toxin protein and part of toxin - useful
 PT to form anti-toxins against Clostridium botulinum type A, and C.
 PT Difficile type toxins, and to treat C. difficile intoxication, partic.
 PT diarrhoea.
 XX
 PS Claim 4; Page 344-350; 434pp; English.
 XX
 CC Clostridium botulinum type A neurotoxin (AAR95010) is processed to form a
 CC dimer composed of a light and a heavy chain. It is the product of the
 CC type A neurotoxin gene (AAT29244). The 50 kDa C-terminal portion of the
 CC heavy chain, or C fragment (see also AAR95008), was produced using a
 CC synthetic gene (AAT29245) having codon usage altered to improve
 CC expression in Escherichia coli. Fusion proteins of the type A toxin or C
 CC fragment, with e.g. maltose binding protein or polyhistidine affinity tag
 CC (see also AAR95008), are used to generate neutralising antitoxins and in
 CC vaccine compsns
 XX
 SQ Sequence 1296 AA;
 AAR95010 Length: 1296 August 31, 2004 14:39 Type: P Check: 7671 ..
 Found using 'seq23' (hayes346.key)

1 MQFVNQPNYKDPVNGVDIAVYKIPNVGQMPQVKAFFKHNIKIWIPIPERDTPTNPEEGDLN
 21 24

61 PPPEAKQPVSYD

... 185

135 INVLPDGSYRSEELNLVITGSSADIIOFECKSPGHEVLNLTNRNGYGSTQVIRFSPDPTF
 233

195 GFESLEVDTNPLLGAGKATDPATVLAHELHAGHLRYGIAINPNRVKVTNAYVEMS
 237

255 GLEVSFEELRTFGHDAKFIDSLQENEFRLYYNKKFIDIASLNLKAKSIVGTTASLOYMK
 287

315 NVFKEKLLSDETSKFSVDKLFKFDKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDKAVF
 342

375 KINIVPKVNTIYDGFNLRTNLNLAANGQNTTEINNMNFTKLNFTGLFFPYKLLCVRG
 384 387

435 ITSKTKSLDGKYNKALNDLCIKVNNWDLFFSPSEDFNTDLNKGEEITSDNIEAAEENI
 446

495 SLDLIQYYITLFDNPEPENISLENLSSDIIGLELMPNIEFPNGKKYELDKYTMFHYL
 503 548 553

555 RACEFHEGKSRIALTNSVNEALLNPSRVYTFPSSDYKVKYNKATEAAMFLGWVQLVYDF
 556 583

615 TDTESEVSTTDKIADITIIIPY

... 583

660 GAVILLEFIEPAIPVLGTALVSYIANKVLTQTQIDNALSKRNEKWDENVKIYIVTNWLA
 583

720 KVTQIDILIRKMKALENQAEATKAIINYQYNTQYTEEKNNINFNIDDLSSKLNESINK
 751

780 AMININKFLNQCSVSYLMNSMIPYG

... 934 938

884 ESNHLIDLSRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVNMSVENFST
 934 938

944 SFWIRIPKYNFNSISLNNEYTIINCMMNSGKMSLNGEIIITWLTQDTQEIKQRVVFKYSQ
 962 980 1001

1004 MINISDYINRWIFVTITNRLNNSKIYINGRLIDQKFIISNLGNIHASNNIMFKLDGCRDT
 1004

1064 HRYTIWKYFNLFDEKELNEKEIKDLYDNQNSGILKDFWGDYLOYDKPYMLNLNLYDPNKYV
 1066 1071 1104 1111 1122

1124 DVNVVGIRGYMYLKGPRGSVMTTNIYLNSSLYRGTKFIIRKYASGNKDNIVRNRDVYIN
 1125 1133 1181

1184 VVYVKNFYRLATNASQAGVEKILSALEIPDVGNLSQVVMKSKNDQGITNCKRNLQDNN
 1184 1191

1244 G

... 1181

 30 matches found in sequence:
 aa99339 ; Clostridium botulinum botulism A toxin protein.
 (from "bt.ags.pep")
 TOIG of: aa99339 check: 5431 from: 1 to: 1295

ID AAU99339 standard; protein; 1295 AA.
 XX
 AC AAU99339;
 XX
 XX 07-OCT-2002 (first entry)
 DT
 XX Clostridium botulinum botulism A toxin protein.
 DE
 XX Botulism A toxin; neuroprotective; muscular; BoTOX; tetanus toxin; TeTOX;
 KW protease cleavage; toxicity; neurotoxin; poison; neural cell; toxin;
 KW post-translational modification; light chain; heavy chain;
 KW spastic condition; stabismus; bophiarospasm; hemifacial spasm;
 KW brain injury; spinal cord injury; stroke; multiple sclerosis;
 KW cerebral palsy; BoNT/A.
 XX Clostridium botulinum.
 OS
 XX
 PH Key Location/Qualifiers
 FT Region 1..437
 FT /note= "Light chain"
 FT Active-site 222
 FT /note= "Forms an active site with Glu223, His226, Glu261,
 FT Tyr365"
 FT Active-site 223
 FT /note= "Forms an active site with His222, His226, Glu261,
 FT Tyr365"
 FT Active-site 226

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FT /note= "Forms an active site with His222, Glu261,
FT Tyr365"
FT 261
FT Active-site
FT /note= "Forms an active site with His222, Glu223, His226,
FT Tyr365"
FT 365
FT Active-site
FT /note= "Forms an active site with His222, Glu223, His226,
FT Glu261"
FT 437..448
FT Region
FT /note= "Linker region"
FT 449..1295
FT Region
FT /note= "Heavy chain"
FT Misc-difference 1161
FT /label= OTHER
FT /note= "OTHER = O, which is not defined in the
FT specification"
XX WO200244199-A2.
XX PN
XX XX
XX 06-JUN-2002.
XX PD
XX XX
XX PF 27-NOV-2001; 2001WO-US045059.
XX XX
XX PR 29-NOV-2000; 2000US-00726949.
XX XX
XX PA (ALLR ) ALLERGAN SALES INC.
XX XX
XX PI Lin W, Aoki KR, Steward LE;
XX XX
XX DR WPI; 2002-557531/59.
XX PT
XX Novel modified botulinum toxin or tetanus toxin comprising a protease
XX cleavage site, is useful for treating conditions benefited by neurotoxin
XX activity.
XX PS
XX Disclosure; Fig 1; 19pp; English.
XX CC
XX The invention discloses modified botulinum toxin (BoToX) or tetanus toxin
XX (TeToX) which contain new protease cleavage sites. These sites are
XX created in regions where the cleavage site is specifically susceptible to
XX cleavage by a protease that is present in effective levels only in a
XX tissue where toxicity is undesirable and where the cleavage site itself
XX does not inactivate the toxin. BoToX and TeToX are neurotoxins which are
XX highly potent and specific poisons of neural cells. The toxins are
XX synthesised in vivo as single chains, which are not toxic, but become
XX active when nicked, in a post-translational modification, to form
XX separate light and heavy chains which are linked through a disulphide
XX bond. The modified toxins are useful to treat conditions benefited by
XX neurotoxin activity (e.g. spastic conditions, including stabismus,
XX buphalarospasm and hemifacial spasm, brain injury, spinal cord injury,
XX stroke, multiple sclerosis and cerebral palsy) by administering the
XX toxins for their localised production. The advantage of the toxins are
XX that they are deactivated in tissues where toxic activity is undesirable
XX and activated at desired targets. The sequence presented is the
XX Clostridium botulinum botulinum A toxin (BoNT/A) protein
XX SQ
XX Sequence 1295 AA;
AAU99339 Length: 1295 August 31, 2004 14:39 Type: P Check: 5431 ..
Found using 'seq23' (hayes346.key)
1 PFVNKQFNKDPVNGVDIAYIKIPNVGQMOPVAKFIHKNKIWIPIERDTFTNPESGDLNP
20 23
61 PPEAKQVPVSYVD
...
134 INVIQDGSYRSEELNLNIIGPSADIIQPECKSFGHVLNLTNRNGVGSQTQYIRFSPDFTF
104

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194 GFBSLEVDTNPLLGGAGKATDPAVTLAHGLIHAGHRLYGLIAGINPNRNVKVTNAYEMS
232 249
254 GLEVSFEELRTFGCHDAKPTIDSLQENEFRLYYNKKFKDIASTLNKAKSIVGTASTASLQYMK
286
314 NVFKEKYLLEDTSKGKFSVDKLFKDKLTKYKMLTEIYTEDNFVKKFVLNRKTYLNFDKAVF
341 365
374 KINIVPKVNYTIYDGFNLRNLTNLAANFNQNTENNMTKLKNTGLPEFYKLLCVRGI
383 386 425
434 ITSSTKSLDKGYNKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEIITSDTNIEAAENI
445
494 SLDLIQQYYLTFTNFDPENEPENISLENLSSDIIGOLELMPNIEPFPNGKKYELDKYTFPHYL
502 547 552
554 -RAQEFHGKSRITALTNVNEALLNPSRVVTFSSDYVKKVKNAKATEAAMFLGWVEQLVYDF
555 582
614 TDETSEVSTTDKIADITIIPY
...
659 GAVILLEFIPEIAIPVLGTFALVSYANKVLTVQITDNLALSKRNEKWDVYKIVTNWLA
709
719 KVTNQIDLIRKKWKEALENAQEAATKAIINYQNOYTEEEKNNINFNIDDLSSKLINESINK
750
779 AMININKFLNQCSVSYLMNSMIPYG
...
883 ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVNYSMYENFST
933 937
943 SPWIRIPKYPNSISLNNEYTIINCENNNNGWKVSLNYGELIWDLQDTQEIQRVVFVKYSQ
961 979 1000
1003 MINISDYINRWIFVTITNRLNLSKIYINGRLIDQKIPISNLGNIHASNNIMFKLDCRDT
1003
1063 HRYTIWKYFNLFDKELNEKEIKLDYDNQNSGILKDFWGDYLYQDKPYMYMLNLYDPNKVV
1065 1070 1103 1110 1121
1123 -DYNVVGIRGYWVLKGPGRGSMVTNINLSSLYRGTKFIKKYASGNKONIVRNNDRVYN
1124 1132 1180
1183 VVKNKKEYRLAINASQVVVFILKLSALEIPDVGNLSQVVVMKSKNDQGITNCKMKMLQDNN
1183 1190
1243 G

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14 matches found in sequence:
aaw09014 ; Immunogenic type F botulinum toxin heavy chain (aa848-1278).
(from "bt_ags.pep")
TOIG of: aaw09014 check: 6826 from: 1 to: 431

ID AAW09014 standard; protein; 431 AA.
XX
AC
XX
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
XX Immunogenic type F botulinum toxin heavy chain (aa848-1278).
XX Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX OS Clostridium botulinum; type F strain Langeland.
XX WO9641881-A1.
XX
XX 27-DEC-1996.
XX
XX 12-JUN-1996; 96WO-GB001409.
XX
XX 12-JUN-1995; 95GB-00011909.
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX WPI; 1997-065467/06.
XX DR N-PSDB; AAT48100.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant
XX vaccine prodn.
XX
XX Claim 5; Page 16-17; 37pp; English.
XX
XX A polypeptide (AAW09014) comprises the heavy chain (amino acids 848-1278)
XX of a type F botulinum neurotoxin (BoNT/F), and can be produced using a
XX synthetic gene (AAT48101) based on the natural gene sequence (AAT48100)
XX for the heavy chain. The polypeptides and its fragments (see also
XX AAW09015-17) lack the light chain and HN epitopes necessary for
XX metalloprotease activity and toxin internalisation. They are free of
XX botulinum toxin activity but can induce protective immunity to a type F
XX botulinum toxin, making them useful for vaccine prodn. Recombinant
XX polypeptides can be produced in transformed host cells, esp. as fusion
XX proteins, e.g. with maltose binding protein to facilitate purification.
XX (Updated on 17-OCT-2003 to standardise OS field)
XX
SQ Sequence 431 AA;

AAW09014 Length: 431 August 31, 2004 14:39 Type: P Check: 6826 ..
Found using 'seq23' (hayes346.key)

1 SYTNDKILILYFNKLYKKIKONSLDMRYENKFKIDISGYGNSISGVDVYIYSTNRNQF
16 19
61 GIYSKSPSEVNIAQNNDIYGRYQNFISFWRIPKYFNKVLNNEVTIIDICIRNNNSG
84 87
121 WKISINYNKIWTLQDTAGNOKLVFNVTOMISIDYINKWTFVTITNNRLGNSRIYING
127
181 NLIIDEKISINLGDIIHVSNDILFKIVGCNDRTVVGIRYFKVFDTGLGKTEITLYSDEPD

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212 217
241 SILKDFWNGYLLNRYKRYLLNLRDKSITQNSFLNINQORGVYQKPNIFSNTRLTYGV
250 257
297
301 EVIIRKNGSDISNTDNFVRKNDLAYINVVDROVRYRLYADISIAKPEKIKIIRTNSN
326 336 339
405
361 NSLQGIIVMDSIGNNCTMNFQNNNGNIGLLGFHSNVLVASSWYNNIRKNTSSNGCFWS
405
421 FISKEHGWQEN
-----
4 matches found in sequence:
aaw09015 ; Immunogenic type F botulinum toxin polypeptide (aa848-991).
(from "bt_ags.pep")
TOIG of: aaw09015 check: 2219 from: 1 to: 144

ID AAW09015 standard; protein; 144 AA.
XX
AC AAW09015;
XX
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
XX Immunogenic type F botulinum toxin polypeptide (aa848-991).
XX Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX OS Clostridium botulinum; type F strain Langeland.
XX WO9641881-A1.
XX
XX 27-DEC-1996.
XX
XX 12-JUN-1996; 96WO-GB001409.
XX
XX 12-JUN-1995; 95GB-00011909.
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
XX Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX WPI; 1997-065467/06.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant
XX vaccine prodn.
XX
XX Claim 5; Page 17-18; 37pp; English.
XX
XX Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-
XX 1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F
XX botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes
XX necessary for metalloprotease activity and toxin internalisation. They
XX are free of botulinum toxin activity but can induce protective immunity
XX to a type F botulinum toxin, making them useful for vaccine prodn.
XX Recombinant polypeptides can be produced in transformed host cells, esp.
XX as fusion proteins, e.g. with maltose binding protein to facilitate
XX purification. (Updated on 17-OCT-2003 to standardise OS field)
XX
SQ Sequence 144 AA;

AAW09015 Length: 144 August 31, 2004 14:39 Type: P Check: 2219 ..
Found using 'seq23' (hayes346.key)

1 SYTNDKILILYFNKLYKKIKONSLDMRYENKFKIDISGYGNSISGVDVYIYSTNRNQF

```

16 19

61 GIVSKPEVNIAQNNDIYNGRYQNFISFWVRIPKYFNKVNLANNEYTIIDCIRNNNSG
84 87 |---| |---|
108

121 WKISLNYNKIIWTLDQTAGNNQKL
127 |---| |---|

5 matches found in sequence:
aaw09016 ; Immunogenic type F botulinum toxin polypeptide (aa992-1135).
(from "bt_ags.pep")
TOIG of: aaw09016 check: 2000 from: 1 to: 144

ID AAW09016 standard; protein; 144 AA.
XX AAW09016;
XX
AC
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
DE
DE Immunogenic type F botulinum toxin polypeptide (aa992-1135).
XX Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX Clostridium botulinum; type F strain Langeland.

XX WO9641881-A1.
XX 27-DEC-1996.
XX
PF 12-JUN-1996; 96WO-GB001409.
XX
PR 12-JUN-1995; 95GB-00011909.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
XX
PI Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX WPI; 1997-065467/06.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant vaccine prodn.
XX
PS Claim 5; Page 18-19; 37pp; English.

XX Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes necessary for metalloprotease activity and toxin internalisation. They are free of botulinum toxin activity but can induce protective immunity to a type F botulinum toxin, making them useful for vaccine prodn.
XX Recombinant polypeptides can be produced in transformed host cells, esp. as fusion proteins, e.g. with maltose binding protein to facilitate purification. (Updated on 17-OCT-2003 to standardise OS field)

XX Sequence 144 AA;

AAW09016 Length: 144 August 31, 2004 14:39 Type: P Check: 2000 ..
Found using 'seq23' (hayes346.key)

1 VFNYTQMISISDYINKWIFVTITNNRLGNSRIYNGNLIDEKSIISNLGDTHVSDNIFKI
4 7 |---| |---| |---| |---|

61 VGCNDRYVCGIRYFKVFDLTKGTEIETLYSDEPDSILKDFGWNLLNRYLLNLLR
68 71 76 |---| |---| |---| |---|
106 113

121 TDKSITQNSNFLNQRGVYQKP

5 matches found in sequence:

aaw09017 ; Immunogenic type F botulinum toxin polypeptide (aall36-1278).
(from "bt_ags.pep")
TOIG of: aaw09017 check: 6556 from: 1 to: 143

ID AAW09017 standard; protein; 143 AA.
XX AAW09017;
XX
XX
DT 17-OCT-2003 (revised)
DT 31-MAR-1997 (first entry)
XX
DE Immunogenic type F botulinum toxin polypeptide (aall36-1278).
XX Botulinum toxin; neurotoxin; BoBT/F; immunogen; vaccine; botulism.
XX Clostridium botulinum; type F strain Langeland.
XX WO9641881-A1.
XX 27-DEC-1996.
XX
PF 12-JUN-1996; 96WO-GB001409.
XX
PR 12-JUN-1995; 95GB-00011909.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX Elmore MJ, Mauchline ML, Minton NP, Pasechnik VA;
XX WPI; 1997-065467/06.
XX
XX Immunogenic type F botulinum toxin polypeptide(s) - allows recombinant vaccine prodn.
XX
PS Claim 5; Page 19; 37pp; English.

XX Novel polypeptides (AAW09014-17) respectively comprise amino acids 848-1278, 848-991, 992-1135 and 1136-1278 in the heavy chain of a type F botulinum neurotoxin (BoNT/F). They lack the L chain and HN epitopes necessary for metalloprotease activity and toxin internalisation. They are free of botulinum toxin activity but can induce protective immunity to a type F botulinum toxin, making them useful for vaccine prodn.
XX Recombinant polypeptides can be produced in transformed host cells, esp. as fusion proteins, e.g. with maltose binding protein to facilitate purification. (Updated on 17-OCT-2003 to standardise OS field)

XX Sequence 143 AA;

AAW09017 Length: 143 August 31, 2004 14:39 Type: P Check: 6556 ..
Found using 'seq23' (hayes346.key)

1 NIFSNTRLTGVETIIRKNGSTDISTDNFVRKNDLAYINVDVDRVEYRLYADISTAKPE
9 12 |---| |---| |---| |---|
38 41 48 51 51 54

61 KIILIRTSNNLSGLIIVMDSIGNNCTNPFQNNNGNIGLLGFHSHNLVASSWYNNI
117 |---|

121 RKNTSNGCFWFSFISKEHGQEN

3 matches found in sequence:

aaw28014 ; Amino acid sequence of botulinum neurotoxin C1 precursor.
(from "bt_ags.pep")
TOIG of: aaw28014 check: 1448 from: 1 to: 193

ID AAW28014 standard; protein; 193 AA.

6 9

 17 matches found in sequence:
 aaw56007 ; Recombinant botulinum neurotoxin type A LH423/A.
 (from "bt_ags.pep")
 TOIG of: aaw56007 check: 6527 from: 1 to: 871

ID AAW56007 standard; protein; 871 AA.
 XX
 AC AAW56007;
 XX
 DT 27-JUL-1998 (first entry)
 XX
 DE Recombinant botulinum neurotoxin type A LH423/A.
 XX
 XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
 KW detection; tetanus; non-toxic; toxin.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 XX WO9807864-A1.
 PN
 XX
 XX 26-FEB-1998.
 PD
 XX
 XX 22-AUG-1997; 97WO-CB002273.
 PF
 XX
 XX 23-AUG-1996; 96GB-00017671.
 PR
 XX 13-DEC-1996; 96GB-00025996.
 PR
 XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 PA
 XX
 XX Shone CC, Quinn CP, Foster KA;
 PI
 XX
 XX WPI; 1998-169168/15.
 DR
 XX N-PSDB; AAV26279.
 DR
 XX
 XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 PT
 XX
 PS Example 1; Page 33-35; 137pp; English.
 XX
 CC The present sequence represents a recombinant neurotoxin protein from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain
 CC is adapted to cleave one or more vesicle or plasma-membrane associated
 CC proteins essential to exocytosis, and where the second domain is adapted:
 CC (a) to translocate the protein into a cell; (b) to increase the
 CC solubility of the protein compared to the solubility of the first domain
 CC on its own, or (c) both to translocate the protein into a cell and to
 CC increase the solubility of the protein compared to the solubility of the
 CC first domain on its own, the protein being free of clostridial neurotoxin
 CC (CN) and free of CN precursor that can be converted into toxin by
 CC proteolytic action. The recombinant proteins can be used as therapeutic
 CC agents for targeting cells expressing a relevant substrate. The products
 CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples
 XX
 SQ Sequence 871 AA;

AAW56007 Length: 871 August 31, 2004 14:39 Type: P Check: 6527 ..
 Found using 'seq23' (hayes346.key)

1 MQFVNKQFNKDPVNGVDIAYIKIPNAGQMOPVKAFKIHNIWVIPDRDTFTNPEGDIN
 21 24
 |---|

61 PPPEAKQVPVSYDD

```

...
135 INVIPDGSYRGEELNLVITGPSADIQFECKSFGEVLNLTRNGYGSQYIRFSPDFTF
    |---|
    185

195 GFESLEVDTNPLLGAGKFPATDPAVTLAHLIHAGHRLYGIAINPNRVKVTNAYEMS
    |---|
    233
    250

255 GLEVSFEELRTFGGDAKFIDSLQENEFRLYYNKEFKDIASLTNKAKSIVGTASLQYMK
    |---|
    287

315 NVFKEKYLISEDTSGRFSVDKLFKDFKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDAVF
    |---|
    342
    366

375 KINIVPKVNYTIYDGNLENLTNLAANFNGQNTNMMNFTKLNFTGLPEFYKLLCVRGI
    |---|
    384
    426

435 ITSSTKSLDKGYNKALNDLCIKVNNWDLFSPSEDNFTNDLNKGBEITSDTNIEAAEENI
    |---|
    446

495 SLDDLIOQYLTNFEDNEPENISIEINLSSDIIIGOLELMPNIERFPNGKKYELDKYTMFHYL
    |---|
    503
    548 553

555 -|
    556
    583

615 TDETSEVSTTDKIADITIIPY
...
660 GAVILLEFTEIAPVIGTFALVSYIANKVLTVQITIDNALSKENKWDVEYKIVTNWLA
    |---|
    710

720 KVTQTDLIRKMKALENQABATKAIINYQNYQTEEEKNNINFNIDDLSSKLNESINK
    |---|
    751

780 AMININKFLNQCSVSLMNSMIPYG
...
-----
17 matches found in sequence:
aaw56008 ; Botulinum neurotoxin type A BoNT/A.
(from "bt_ags.pep")
TOIG of: aaw56008 check: 6525 from: 1 to: 871

ID AAW56008 standard; protein; 871 AA.
XX
AC AAW56008;
XX
XX 27-JUL-1998 (first entry)
XX
DE Botulinum neurotoxin type A BoNT/A.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Clostridium botulinum.
XX
XX WO9807864-A1.
XX
XX
XX
XX

```

PD 26-FEB-1998.
 XX
 PF 22-AUG-1997; 97WO-GB002273.
 XX
 PR 23-AUG-1996; 96GB-00017671.
 PR 13-DEC-1996; 96GB-00025996.
 XX
 PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 XX
 PI Shone CC, Quinn CP, Foster KA;
 XX WPI; 1998-169168/15.
 DR N-PSDB; AAV26280.
 XX
 XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 XX
 XX Disclosure; Page 52-54; 137pp; English.
 PS
 CC The present sequence represents botulinum neurotoxin type A from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain
 CC is adapted to cleave one or more vesicle or plasma-membrane associated
 CC proteins essential to exocytosis, and where the second domain is adapted:
 CC (a) to translocate the protein into a cell; (b) to increase the
 CC solubility of the protein compared to the solubility of the first domain
 CC on its own, or (c) both to translocate the protein into a cell and to
 CC increase the solubility of the protein compared to the solubility of the
 CC first domain on its own, the protein being free of clostridial neurotoxin
 CC (CN) and free of CN precursor that can be converted into toxin by
 CC proteolytic action. The recombinant proteins can be used as therapeutic
 CC agents for targeting cells expressing a relevant substrate. The products
 CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples
 XX
 SQ Sequence 871 AA;
 AAW56008 Length: 871 August 31, 2004 14:39 Type: P Check: 6525 ..
 Found using 'seq23' (hayes346.key)
 1 MPFVNKQFNKYKDPVNGVDIAVIKIPNAGQMOPVKAFKIHKNKIWIPIERTDTNPEEGDLN
 21 24
 61 PPPEAKQVPVSYDD
 ...
 135 INVIQDGSYRSEELNLVIGSADIIOECKSGFGEVLNITRNGYGSQTQYIRFSPDPTF
 185
 195 GFESLEVDNTPLLGAAGKATDPAVTLAHELHAGHRLYGIAINPNRVKVTNAYVEMS
 233
 255 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKKFKDIASTLNKAKSIVGTASLQYMK
 287
 315 NVFKEVLLSEDTSGKFSVDKLFKFDKLYKMLTEIYTEDNFVKFKVLNRKTYLNPDKAVF
 342
 375 KINIVPKVNYTYIDGFLNRLNLTNLAANFNQNTNINNMFTKLKNTGFLFEFKLLCVRGI
 384 387

435 ITSKTSLDKGYNKALNDLCIKVNNWDLFFSPSDNFTNDLNKGEITSDTNEAAEENI
 446
 495 SLDLIQOYLTFTFNDNEPENISIEIENLSSDIIGQLELMPNIEFPNGKKYELDKYTMFHYL
 503
 555 RAQFEHGKSRIALTNSVNEALLNPSRYVITFFSSDYVKKNKATEAAMFLGWVQLVYDF
 583
 615 TDETSEVSTTDKIADITIIPY
 ...
 660 GAVILLEFPIEIAIPVLGTALVSYIANKVLTVQTIDNALSKRNEKWDEYKYIVTNWLA
 710
 720 KVNTQIDILRKKEALENQAEATKAIINYOYQYTBEEKNNINFINNIDLSKLNESINK
 751
 780 AMININKFLNQCSVSYLMNSMIPYG
 ...
 16 matches found in sequence:
 aaw56009 ; Recombinant botulinum neurotoxin type A L/4H423/A.
 (from "bt ags.pgp")
 TOIG of: aaw56009 check: 543 from: 1 to: 875
 ID AAW56009 standard; protein; 875 AA.
 XX
 AC AAW56009;
 XX
 DT 27-JUL-1998 (first entry)
 XX
 DE Recombinant botulinum neurotoxin type A L/4H423/A.
 XX
 KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
 KW detection; tetanus; non-toxic; toxin.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 FN WO9807864-A1.
 XX
 PD 26-FEB-1998.
 XX
 PF 22-AUG-1997; 97WO-GB002273.
 XX
 PR 23-AUG-1996; 96GB-00017671.
 PR 13-DEC-1996; 96GB-00025996.
 XX
 PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 XX
 PI Shone CC, Quinn CP, Foster KA;
 XX WPI; 1998-169168/15.
 DR N-PSDB; AAV26281.
 XX
 PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 XX
 PS Example 1; Page 58-60; 137pp; English.
 CC The present sequence represents a recombinant neurotoxin protein from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain

CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 875 AA;

AAW56009 Length: 875 August 31, 2004 14:39 Type: P Check: 543
Found using 'seq23' (hayes346.key)

```
1  MQFVNKFQYKDPVNGVDIAYIKIPNAGQMPQKAFKIHNKIWIPIERDTFTNPEEGDLN
    21 24
61  PPPEAKQVPVSYD
...
135  INVIQDGSYRSEBELNVIIGPSADIIQFECKSFGEVNLNTRNGYGSTQVIRFSPDFTF
    185
195  GFESLEVDNPLLGAGKFNATDPAVLAHELHAGHLYGTAINPNRVKVTNAYTEMS
    233
255  GLEVSFEELTFGCHDAKFIDSLQENEFRLYYNKFQDKDIASLNLKAKSIVGTTSALQYMK
    287
315  NVFKERYLLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKFKVLNRKTYLNFDKAVF
    342
375  KINIVPKVNTIYDGFNLRLNTLAANFNGQNTTEINNMNFTKLKNTGLFPEFYKLLCVRGI
    384
435  ITSKTSLDKGYNSADGALNDLCIKVNNWDLFFSPSEDNFTNDLNGKEEITSDTNIEAA
    507
495  EENISLDLIQQYLYTFDNFENEPENISLENLSSDIIGQLELMPNIEFPFGKGYVELDKYTM
    555
555  FHYLRQBEFHGKSRIALNSVNEALLNPSRVYTFSSDYVKKVKVKAATEAAMFLGWVQL
    587
615  VYDFDTESEVSTTDKIADITIIPY
...
664  GAVILLEFIPEIAIPVLGTFAVLSYIANKVLTVQTIDNALSKRNEKWEVYKVIYNWLA
    714
724  KVTQIDILIRKKMKEALENOAEATKAIINYQNYQVTEEEKNNINFNIDDLSSKLNSINK
    755
784  AMININKFLNQCQSVSYLMSNIFPY
```

...

17 matches found in sequence:

aw56010 ; Recombinant botulinum neurotoxin type A LFXa/3H423/A.
(from "bt_ags.pep")
TOIG of: aw56010 check: 4601 from: 1 to: 878

ID AAW56010 standard; protein; 878 AA.

XX AAW56010;

XX 27-JUL-1998 (first entry)

XX Recombinant botulinum neurotoxin type A LFXa/3H423/A.

XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.

XX Synthetic.

XX Clostridium botulinum.

XX WO9807864-A1.

XX 26-FEB-1998.

XX 22-AUG-1997; 97WO-GB002273.

XX 23-AUG-1996; 96GB-00017671.

XX 13-DEC-1996; 96GB-00025996.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX (SPEY-) SPEYWOOD LAB LTD.

XX Shone CC, Quinn CP, Foster KA;

XX WPI; 1998-169168/15.

XX N-PSDB; AAV26282.

XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.

XX Example 1; Page 64-66; 137pp; English.

XX The present sequence represents a recombinant neurotoxin protein from the
XX present invention. The present invention describes recombinant neurotoxin
XX proteins which comprise a first and second domain, where the first domain
XX is adapted to cleave one or more vesicle or plasma-membrane associated
XX proteins essential to exocytosis, and where the second domain is adapted:
XX (a) to translocate the protein into a cell; (b) to increase the
XX solubility of the protein compared to the solubility of the first domain
XX on its own, or (c) both to translocate the protein into a cell and to
XX increase the solubility of the protein compared to the solubility of the
XX first domain on its own, the protein being free of clostridial neurotoxin
XX (CN) and free of CN precursor that can be converted into toxin by
XX proteolytic action. The recombinant proteins can be used as therapeutic
XX agents for targeting cells expressing a relevant substrate. The products
XX can also be used as immunogens and as non-toxic standards for the
XX assessment and development of in vitro assays for the detection of
XX functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX environmental samples

XX Sequence 878 AA;

AAW56010 Length: 878 August 31, 2004 14:39 Type: P Check: 4601
Found using 'seq23' (hayes346.key)

1 MQFVNKFQYKDPVNGVDIAYIKIPNAGQMPQKAFKIHNKIWIPIERDTFTNPEEGDLN
21 24

61 PPPEAKQVPVSYD

```
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSFGEVLNLTNRNGYSTQYIRFSPDFTF
      |---|
      185
195 GFESLEVDNPLLGAGKFAATDPAVTLAHELHAGHRLYGIAINPNRVKVNTRYIEMS
      |---|
      233
255 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKFQDIAGTLNKAQKSIQVGTASLQYMK
      |---|
      287
315 NVFKEKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKKFVLNRKTYLNFDAKVF
      |---|
      342
375 KINIVPKVNYTIYDGFNLRLNTLNAANFNGQNTENNMMFTKLNKFTGLFEFYKLLCVRGI
      |---|
      426
435 ITSKTKSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEIITSDNI
      |---|
      446
495 EAAEENISLDLIQQYLTGFNFEDNEPENISLENSSDIIGQLLELMPNIBRFPNGKKYELDK
      |---|
      510
555 YTMFHLRAQEFHGKSRIALTNSVNEALLNPSRVYTFSSDYVKKVNKATEAAMFLGWV
      |---|
      590
615 EQLVYDFDTETSEVSTDKIADITIIPY
      |---|
      717
667 GAVILLEPIETAIPLVGTALVSYIANKVLTVQITIDNALSXRNEKWDVYKYIVTNMLA
      |---|
      758
727 KVNQTIDLRKKVKEALENQAEATKAIINYNQYQTEEEKNNINFNIDDLSSKLNESINK
      |---|
      758
787 AMININKFLNQCSVSYLMNSMIPYG
      |---|
      758
...
17 matches found in sequence:
aaw56011 : Recombinant botulinum neurotoxin type A LFXa/3H423/A-IGF-1.
(from "bt_ags.pep")
TOIG of: aaw56011 check: 2660 from: 1 to: 953
ID AAW56011 standard; protein; 953 AA.
XX
AC AAW56011;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LFXa/3H423/A-IGF-1.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
XX Clostridium botulinum.
```

PN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SEFY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
PI WPI; 1998-169168/15.
XX N-PSDB; AAV26283.
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
XX Example 1; Page 70-73; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 953 AA;
AAW56011 Length: 953 August 31, 2004 14:39 Type: P Check: 2660 ..
Found using 'seq23' (hayes346.key)

1 MQFVNKQFNKDPVNGVDIAYIKIPNAGQMFPVKAFKIHNKIWIPIERDTFTNPEBDLN
21 24
61 PPPEAKQVPSYYD
...
135 INVIQPDGSRSEELNLVIIGPSADIIQFECKSFGEVLNLTNRNGYSTQYIRFSPDFTF
185
195 GFESLEVDNPLLGAGKFAATDPAVTLAHELHAGHRLYGIAINPNRVKVNTRYIEMS
233
255 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKFQDIAGTLNKAQKSIQVGTASLQYMK
287
315 NVFKEKYLSEDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKKFVLNRKTYLNFDAKVF
342
375 KINIVPKVNYTIYDGFNLRLNTLNAANFNGQNTENNMMFTKLNKFTGLFEFYKLLCVRGI
426

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387
100 ITSKYSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPEDNFTNDLNKGEETSDTNI
146
435 EAAEENISLDLIQQYLYLTFFDNFNEPENISNIENSSDIIGQLELMPNTERPFGKGYELDK
510
495 YTMFHYLRAQEFHKGSRIALTNSVNEALLNPSRVYTFSSDYVKKVKKATEAAMFLGW
555 555 560
615 EQLVYDFDTESEVSTTDKIADITIIIPY
...
667 GAVILLEFIPEIAPVLGTFAVSYIANKVLTQVTDNALSKRNEKWDVYKYIVTNWLA
717
727 KVTQIDLIRKMKALEAQEATKAIINYQYQYTEEEKNNINFINIDDLSSKINESINK
758
787 AMININKFLNQCSVSYLMNSMIPYG
...
17 matches found in sequence:
aaw56012; Recombinant botulinum neurotoxin type A LFxa/3H423/A-CtxA 14.
TOIG of: aaw56012 check: 9225 from: 1 to: 907

ID AAW56012 standard; protein; 907 AA.
XX
AC AAW56012;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type A LFxa/3H423/A-CtxA 14.
XX
KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KW detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX
FN WO9807864-A1.
XX
PD 26-FEB-1998.
XX
PF 22-AUG-1997; 97WO-GB002273.
XX
PR 23-AUG-1996; 96GB-00017671.
XX
PR 13-DEC-1996; 96GB-00025996.
XX
PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
PI Shone CC, Quinn CP, Foster KA;
XX
DR WPI; 1998-169168/15.
DR N-FSDS; AAW26284.
XX
PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
PS Example 1; Page 77-79; 137pp; English.
XX
CC The present sequence represents a recombinant neurotoxin protein from the

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```

CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 907 AA;

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AAW56012 Length: 907 August 31, 2004 14:39 Type: P Check: 9225 ..
Found using 'seq23' (hayes346.key)

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1 MQFVNQFNVKDPVGVDTAYIKIPNAGQMPVKAFKIHNNKIWIPIERDTFTNPEGDLN
21 24
61 PPPEAKQVPVSYD
...
135 INVIPDGSYRSEELNLVIIGPSADIIQFECKSGHEVLNLTNRNGYQSTQYIRFSPDFTF
185
195 GREESLEVDTNPLLGAGKFPATDPAVTLAHLIHAGHRLYGIATNPVRNFKVNTNAYEMS
233
255 GLEVSPEELRTFGHDAKFIDSLQENEFRLYYNKFKDIASTLNKAKSIVGTASLQYMK
287
315 NVFKEXYLLSEDTSGKFSVDKLFKDKYKMLTEIYTEDNFVFKFKVNLNKTLYINFDKAVF
342
375 KINIVPKVNYTYIDGFLNLTNLAANFNGQNTNINNMNFTKLKNFTGLFEFYKLLCVRGI
384 387
435 ITSKYSLDKGYNKIEGRCDGALNDLCIKVNNWDLFFSPEDNFTNDLNKGEETSDTNI
446
495 EAAEENISLDLIQQYLYLTFFDNFNEPENISNIENSSDIIGQLELMPNTERPFGKGYELDK
510
555 YTMFHYLRAQEFHKGSRIALTNSVNEALLNPSRVYTFSSDYVKKVKKATEAAMFLGW
555 560
615 EQLVYDFDTESEVSTTDKIADITIIIPY
...
667 GAVILLEFIPEIAPVLGTFAVSYIANKVLTQVTDNALSKRNEKWDVYKYIVTNWLA
717

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727 KVTQIDLIKKMKEALENQAATKALINQYNQYTEEEKNNINFNIDDLSSKLNESINK
758

787 AMININKFLNQCSVSYLMNSMIPYG

19 matches found in sequence:

aaW56013 ; Recombinant botulinum neurotoxin type A LFXa/3H423/A-ZZ.
(from "bt_ags.pep")
TOIG of: aaW56013 check: 4003 from: 1 to: 1013

ID AAW56013 standard; protein; 1013 AA.

XX AC

XX DT

XX 27-JUL-1998 (first entry)

XX Recombinant botulinum neurotoxin type A LFXa/3H423/A-ZZ.

XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;

XX detection; tetanus; non-toxic; toxin.

XX Synthetic.

XX Clostridium botulinum.

XX WO9807864-A1.

XX 26-FEB-1998.

XX 22-AUG-1997; 97WO-GB002273.

XX 23-AUG-1996; 96GB-00017671.

XX 13-DEC-1996; 96GB-00025996.

XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.

XX (SPEY-) SPEYWOOD LAB LTD.

XX Shone CC, Quinn CP, Foster KA;

XX WPI; 1998-169168/15.

XX N-PSDB; AAV26285.

XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,

XX immunogens or as non-toxic standards for the detection of neurotoxins.

XX Example 1; Page 83-86; 137pp; English.

XX The present sequence represents a recombinant neurotoxin protein from the
XX present invention. The present invention describes recombinant neurotoxin
XX proteins which comprise a first and second domain, where the first domain
XX is adapted to cleave one or more vesicle or plasma-membrane associated
XX proteins essential to exocytosis, and where the second domain is adapted:
XX (a) to translocate the protein into a cell; (b) to increase the
XX solubility of the protein compared to the solubility of the first domain
XX on its own, or (c) both to translocate the protein into a cell and to
XX increase the solubility of the protein compared to the solubility of the
XX first domain on its own, the protein being free of clostridial neurotoxin
XX (CN) and free of CN precursor that can be converted into toxin by
XX proteolytic action. The recombinant proteins can be used as therapeutic
XX agents for targeting cells expressing a relevant substrate. The products
XX can also be used as immunogens and as non-toxic standards for the
XX assessment and development of in vitro assays for the detection of
XX functional botulinum or tetanus neurotoxins either in foodstuffs or in
XX environmental samples

XX Sequence 1013 AA;

AAW56013 Length: 1013 August 31, 2004 14:39 Type: P Check: 4003

Found using 'seq23' (hayes346.key)

1 MQFVNKQFNYPKDPVNGVDIAYIKIPNAGQMOPVKAFLIHNKIWIPIERDTFTNPEGDNL
21 24

61 PPPEAKQVPVSYD

...

135 INVIQDGSYRSEELNLVIIGPSADIIQPECKSGFGEVLNLTNRNGYSTQYIRFSPDFTF
185

195 GFESLEVDTNPLLGAGKFATPAVTLAHLIHAHRLYGIALNPNRVKVNINAYTEMS
233 250

255 GLEVSPEELRTFGHDAKFIDSLQENEFRLYYNKKFKDIASTLNKAKSIVGTTASLOYMK
287

315 NVFKEKYLLEDGTSKGFSVDKLFKDFKLYKMLTEIYTEDNFVKFKVLNRRKTYLNFDKAVF
342 366

375 KINIVPKVNTIYDGFENLRNTNLAANFNGQNTENNNTKLNFTGLFEPFKLLCVRGI
384 426

435 ITSKTSLDKYNGKIEGRCDGALNDLCIKVNNWDLFFSPSEDNFTDLNKGEITSNTI
446

495 EAARENISLDLIQQYYLTFFNEDPENISIENTLSSDIIGQLLELMPNTERPPNGKKYELDK
510

555 YTMFHYLRAQEFEGHKGSRIALTNSVNEALLNPSRVYTFSSDYVKVKNKATEAAMFLGW
555 560 590

615 EQLVYDFTDETSEVSTTDKIADIITIIPIY

...

667 GAVILLEFIEPIAIPVLGTFAVSVIANKVLTVQTDINALSKRNEKWDVYKIVTNWLA
717

727 KVTQIDLIKKMKEALENQAATKALINQYNQYTEEEKNNINFNIDDLSSKLNESINK
758

787 AMININKFLNQCSVSYLMNSMIPYG

...

859 QLSKYVDNQRLLSLTFEYIKSLGSLSPGAHVAHQDEAVDNKFNKEQONAFYELHLPLNLN
909

919 EBQRNFIQSLKDDPSQSANLAEAKKLNDAAQAPKVDNKNFNKEQONAFYELHLPLNLEE
967

979 QRNFIQSLKDDPSQSANLAEAKKLNDAAQAPKVD

7 matches found in sequence:
aaW56014 ; Recombinant botulinum neurotoxin type B LH107/B.
(from "bt_ags.pep")
TOIG of: aaW56014 check: 8055 from: 1 to: 548

ID AAW56014 standard; protein; 548 AA.
AC AAW56014;
XX
DT 27-JUL-1998 (first entry)
XX
DE Recombinant botulinum neurotoxin type B LH107/B.
XX
XX Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
KM detection; tetanus; non-toxic; toxin.
XX
OS Synthetic.
OS Clostridium botulinum.
XX WO9807864-A1.
XX
XX 26-FEB-1998.
XX
XX 22-AUG-1997; 97WO-GB002273.
XX
XX 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
PI WPI; 1998-169168/15.
XX N-PSDB; AAV26286.
DR
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
XX Example 2; Page 103-104; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 548 AA;

AAW56014 Length: 548 August 31, 2004 14:39 Type: P Check: 8055 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIMWPPFARGTGYKAFKLTDRILIPRYTFGYKPDFN
33 36
34 37

61 KSSGIFNRDVCYEYDPDYINTNDKNI

...

149 ERKKGIFANLIIFGPGPVLNENETIDIGIQNHFAREGFGGIMQMKPCPEYVSFNNVQE
199

209 NKGASIFNRRGYFSDPALIIMHLEIHLVHGLYGIKVDLPIVPNEKFFMQSTDAIQAE
269 LYTFGGQDPSIITPSTDKSYDKVLQNFGRGIVDRLNKVLVCISDPNININIKYKFKDKY
289
329 KFYVDESGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKNLLD
331
389 NEIYTIIEGFNISDKDMEKEYRCNKAINKQAYEEISKEHLAVYKIQMCKSVKAPGICID
421
449 VDNEDLFFIADKNSFSDLSKNERIE
...

18 matches found in sequence:
aaw56015 ; Recombinant botulinum neurotoxin type A 23LH423/A (Q2E,N26K,A27Y).
(from "bt ags.bep")
TOIG of: aaw56015 check: 3595 from: 1 to: 894
ID AAW56015 standard; protein; 894 AA.
XX
XX AAW56015;
AC
XX
DT 27-JUL-1998 (first entry)
XX
XX Recombinant botulinum neurotoxin type A 23LH423/A (Q2E,N26K,A27Y).
DE Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
XX detection; tetanus; non-toxic; toxin.
XX
XX Synthetic.
OS Clostridium botulinum.
XX WO9807864-A1.
XX
XX 26-FEB-1998.
XX
XX 22-AUG-1997; 97WO-GB002273.
XX
XX 23-AUG-1996; 96GB-00017671.
PR 13-DEC-1996; 96GB-00025996.
XX
XX (MICR-) MICROBIOLOGICAL RES AUTHORITY.
PA (SPEY-) SPEYWOOD LAB LTD.
XX
XX Shone CC, Quinn CP, Foster KA;
PI WPI; 1998-169168/15.
XX N-PSDB; AAV26287.
DR
XX
XX Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
PT immunogens or as non-toxic standards for the detection of neurotoxins.
XX
XX Example 1; Page 39-42; 137pp; English.
XX
XX The present sequence represents a recombinant neurotoxin protein from the
CC present invention. The present invention describes recombinant neurotoxin
CC proteins which comprise a first and second domain, where the first domain
CC is adapted to cleave one or more vesicle or plasma-membrane associated
CC proteins essential to exocytosis, and where the second domain is adapted:
CC (a) to translocate the protein into a cell; (b) to increase the
CC solubility of the protein compared to the solubility of the first domain
CC on its own, or (c) both to translocate the protein into a cell and to
CC increase the solubility of the protein compared to the solubility of the
CC first domain on its own, the protein being free of clostridial neurotoxin
CC (CN) and free of CN precursor that can be converted into toxin by
CC proteolytic action. The recombinant proteins can be used as therapeutic
CC agents for targeting cells expressing a relevant substrate. The products
CC can also be used as immunogens and as non-toxic standards for the
CC assessment and development of in vitro assays for the detection of
CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
CC environmental samples
XX
SQ Sequence 548 AA;

CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples
 XX
 SQ Sequence 894 AA;

AAW56015 Length: 894 August 31, 2004 14:39 Type: P Check: 3595 ..
 Found using 'seq23' (hayes346.key)

1 GSPGIHMTSTRLQKLEFELPGTGFMEFVKQFNYKDPVNGVDIAYIKIPKYGQMPVKAFK
 44 47 50 53

61 IHNKIWIPIERTFTNPEEGDLNPPPEAKQVPVSYDSTVLS

...

158 INVIQDGSYRSEELNLVIIGPSADIIQPECKSPGHEVLNITRNGYSGTOYIRFSPDFTF
 208

218 GFESLEVDTNPLIGAGKATDPATVLAHELHAGHRLYGIAINPNRVFKVNTWAYYEMS
 256 273

278 GLEVSFELRTFGHDAKFIDSLQENEFRLYYNKFDFDIASITLNKAKSIVGTTASLQYMK
 310

338 NVFKEYLSDTSGKFSVDKLFKDKLYKMLTEIYTEDNFVKFVLNKRKTYLNFDRKAVF
 365 389

398 KINIVPKVNTIYDGFNLRTNINLAANFNGQNTINNMMFTKLKNFTGLFEPFKLILCVRGI
 407 410 449

458 ITSKTSLDKYKALNDLCIKVNNWDLFFSPSEDNFTNDLNKGEEITSDTNIEAAEENI
 469 571 576

518 SLDLIQYILTFNFDNEPENISLSSDIICQLELMPNIEFPPNGKKYKLDKTYMFKYL
 526 571 576

578 RAQFEHCKSRIALTNSVNEALLNPSRYVTFSSDYVKVKVKATEAAMFLGWVEQLVYDF
 579 606

638 TDETSEVSTTDKIADITIIIPY

...

683 GAVILLEPIEIPALVPGTFALVSIANKVLTVQIDNALSKRNEKDEVIKYIVTNWLA
 733

743 KVTQIDLIRKKWKEALENQAETKAIINYQVYTEBEKNNINFINIDLSSKLNESINK
 774

803 AMININKFLNQCSVYLMNSMIPYG

...

 18 matches found in sequence:
 aaw56016 ; Recombinant botulinum neurotoxin type A 2LH423/A (Q2E,N26K,A27Y).
 (from "bt_ags.pep")
 TOIG of: aaw56016 check: 1709 from: 1 to: 873

ID AAW56016 standard; protein; 873 AA.
 XX
 AC AAW56016;
 XX
 DT 27-JUL-1998 (first entry)
 XX
 DE Recombinant botulinum neurotoxin type A 2LH423/A (Q2E,N26K,A27Y).
 XX
 KW Botulinum; recombinant; Clostridium botulinum; neurotoxin; immunogen;
 KW detection; tetanus; non-toxic; toxin.
 XX
 OS Synthetic.
 OS Clostridium botulinum.
 XX
 PN WO9807864-A1.
 XX
 PD 26-FEB-1998.
 XX
 PF 22-AUG-1997; 97WO-GH002273.
 XX
 PR 23-AUG-1996; 96GB-00017671.
 PR 13-DEC-1996; 96GB-00025996.
 XX
 PA (MICR-) MICROBIOLOGICAL RES AUTHORITY.
 PA (SPEY-) SPEYWOOD LAB LTD.
 XX
 PI Shone CC, Quinn CP, Foster KA;
 XX
 DR WPI, 1998-169168/15.
 DR N-PSDB; AAV26288.
 XX
 PT Recombinant neurotoxin polypeptides - used to develop therapeutic agents,
 PT immunogens or as non-toxic standards for the detection of neurotoxins.
 XX
 PS Example 1; Page 45-48; 137pp; English.
 XX
 CC The present sequence represents a recombinant neurotoxin protein from the
 CC present invention. The present invention describes recombinant neurotoxin
 CC proteins which comprise a first and second domain, where the first domain
 CC is adapted to cleave one or more vesicle or plasma-membrane associated
 CC proteins essential to exocytosis, and where the second domain is adapted:
 CC (a) to translocate the protein into a cell; (b) to increase the
 CC solubility of the protein compared to the solubility of the first domain
 CC on its own; or (c) both to translocate the protein into a cell and to
 CC increase the solubility of the protein compared to the solubility of the
 CC first domain on its own, the protein being free of clostridial neurotoxin
 CC (CN) and free of CN precursor that can be converted into toxin by
 CC proteolytic action. The recombinant proteins can be used as therapeutic
 CC agents for targeting cells expressing a relevant substrate. The products
 CC can also be used as immunogens and as non-toxic standards for the
 CC assessment and development of in vitro assays for the detection of
 CC functional botulinum or tetanus neurotoxins either in foodstuffs or in
 CC environmental samples
 XX
 SQ Sequence 873 AA;
 AAW56016 Length: 873 August 31, 2004 14:39 Type: P Check: 1709 ..
 Found using 'seq23' (hayes346.key)

1 GSMEFVNQFNYKDPVNGVDIAYIKIPKYGQMPVKAFKIHNIWIPIERTFTNPEGD
 23 26 29 32

61 LNPPPEAKQVPVSYDSTVLS

...

137 INVIQDGSYRSEELNLVIIGPSADIIQPECKSPGHEVLNITRNGYSGTOYIRFSPDFTF
 187

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XX 07-DEC-1998 (first entry)
XX Clostridium botulinum toxin E C fragment.
DE Antitoxin; vaccine; neurotoxin; toxin E; intoxication; immunogen;
XX botulism; BotE.
XX Clostridium botulinum; serotype E strain NCTC 11219.
OS Synthetic.
XX
XX Key Location/Qualifiers
XX Peptide 1..21 /note= "N-terminal His tag"
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30585.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX
XX Example 41; Page 327-329; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
XX Clostridium botulinum (NCTC 11219) type E neurotoxin, encoded by a DNA
XX sequence (see AAV30585) in plasmid pETH18b. This vector is used to
XX express BotE soluble C fragment in Escherichia coli host cells, and the
XX recombinant C fragment was purified on an affinity column. The invention
XX relates to recombinant proteins derived from C. botulinum toxins,
XX especially type B and type E toxins. Methods are provided which allow for
XX the isolation of soluble recombinant proteins free of significant
XX endotoxin contamination. Preferred hosts for production of recombinant
XX proteins are E. coli, insect cells and yeast cells. The recombinant
XX toxins are used as immunogens for the production of vaccines and
XX antitoxins that are useful in the treatment of humans and animals at risk
XX of intoxication with clostridial toxin
XX
XX Sequence 452 AA;
XX
AAW68396 Length: 452 August 31, 2004 14:39 Type: P Check: 4403
Found using 'seq23' (hayes346.key)
...
55 MRYKNDKYVDTSGYDSNININGDVYKPTKNQFGIDNDKLSFVNISQNDYIYDNKYKN
105 112
115 FSISFWRIPNYDNKIVNVNNEYTTINCRCNNDNNGWKSILNHNIEIWLQDNAGINQKIA
137
175 FNYGNANGISDYINKWIFVTITNDRLGDSKLYINGNLIDQKXILNLGNLHVSDNLFKIV
177
235 NCSYTRYIGIRYFNIFDKELDETEIOTLYSNBPTNLKDFWGNLKYLLYDKEYLLNLKP
238 246
279 286

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241
295 NNFIDRRKOSTLSINNIRSTILLANRLYGIKVKIQRVNNSSTNDNLVRKNDQVYINFA
322 349
355 SKTHLFLPYADYATTNKEKTIKISSGNRPNQVVNMSVGNCTMNFKNNGNIGLLGF
415 KADTVVASTWYTHMRDHTNSNGCFWNFISEHGWQEK
426
-----
13 matches found in sequence:
aaw68397 ; Clostridium botulinum type C1 toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68397 check: 2269 from: 1 to: 462
ID AAW68397 standard; protein; 462 AA.
XX
XX AAW68397;
XX
XX DT 07-DEC-1998 (first entry)
XX
XX DE Clostridium botulinum type C1 toxin C fragment.
XX
XX KW Antitoxin; vaccine; neurotoxin; toxin C; intoxication; immunogen;
XX botulism; BotC.
XX
XX OS Clostridium botulinum; serotype C1 strain Stockholm.
XX Synthetic.
XX
XX FH Key Location/Qualifiers
XX Peptide 1..21 /note= "N-terminal His tag"
XX
XX PN WO9808540-A1.
XX
XX PD 05-MAR-1998.
XX
XX PF 28-AUG-1997; 97WO-US015394.
XX
XX PR 28-AUG-1996; 96US-00704159.
XX (OPHI-) OPHIDIAN PHARM INC.
XX Williams JA, Thalley BS;
XX WPI; 1998-230234/20.
XX N-PSDB; AAV30588.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
XX botulinum type B or E toxin - useful to treat humans and other animals at
XX risk of intoxication with clostridial toxin.
XX
XX Example 45; Page 339-341; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
XX Clostridium botulinum (Stockholm strain) type C1 neurotoxin, encoded by a
XX DNA sequence (see AAV30588) in plasmid pETH18b. This vector is used to
XX express BotC soluble C fragment in Escherichia coli host cells, and the
XX recombinant C fragment was purified on an affinity column. The invention
XX relates to recombinant proteins derived from C. botulinum toxins,
XX especially type B and type E toxins. Methods are provided which allow for
XX the isolation of soluble recombinant proteins free of significant
XX endotoxin contamination. Preferred hosts for production of recombinant
XX proteins are E. coli, insect cells and yeast cells. The recombinant
XX toxins are used as immunogens for the production of vaccines and
XX antitoxins that are useful in the treatment of humans and animals at risk
XX of intoxication with clostridial toxin
XX
XX Sequence 462 AA;
XX

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```
AAW68397 Length: 462 August 31, 2004 14:39 Type: P Check: 2269 ..
Found using 'seq23' (hayes346.key)
...
52 NTLVDTSGYNAEVSEBQDVQLNFIPIPFDFKLGSSGDRGKVIIVTONENIVNSMYESFSI
102 106
112 SFWIRINKWVSNLPVGTIIIDSVKXNNSGWSIGIISNLFVFLTKQNEDESEQSNFSDISNN
127
172 APGYKNWFFVTVTNMMGNMKIYINGKLIDTIKVKELTGINFSTKITFEINKIPDTGLIT
175
232 SDSDNINMWIRDFYIFAKELDGKDGINILFNSLQYTNVVKDYWGNDLRYNKEYYNVNDYL
245 265
292 NRYMYANSRQIVFNTNRNNDNFEGYKIIIRKIRGNTNDRVRGGDILYFDMTINNKAYN
294 317 340 350
352 LFMKNETYADNHSTEDIYAIGLEQTKDINDNIIFOIQPMNNTYYASQIFKSNFNGEN
353
412 ISGICSIGTVFRFLGGDWYRHNLYVPTVKQNYASLLESTSTHWGFVPVSE
444
-----
9 matches found in sequence:
aaw68398 ; Clostridium botulinum type D toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68398 check: 8451 from: 1 to: 451
ID AAW68398 standard; protein; 451 AA.
XX
AC AAW68398;
XX
DT 07-DEC-1998 (first entry)
XX
DE Clostridium botulinum type D toxin C fragment.
XX
KW Antitoxin; vaccine; neurotoxin; toxin D; intoxication; immunogen;
KW botulism; BoCD.
XX
OS Clostridium botulinum; serotype D.
XX
PH key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX
XX (OPHI-) OPHIDIAN PHARM INC.
XX
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
XX
XX N-PSDB; AAV30591.
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XX
PT Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 47; Page 352-353; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
XX Clostridium botulinum seotype D neurotoxin, encoded by a DNA sequence
XX (see AAV30591) in plasmid pETHisB. This vector can be used to express
XX BoD soluble C fragment in Escherichia coli host cells, with the
XX recombinant C fragment being purified on an affinity column. The
XX invention relates to recombinant proteins derived from C. botulinum
XX toxins, especially type B and type E toxins. Methods are provided which
XX allow for the isolation of soluble recombinant proteins free of
XX significant endotoxin contamination. Preferred hosts are E. coli, insect
XX cells and yeast cells. The recombinant toxins are used as immunogens for
XX the production of vaccines and antitoxins useful in the treatment of
XX humans and animals at risk of intoxication with clostridial toxin
XX
XX Sequence 451 AA;
XX
AAW68398 Length: 451 August 31, 2004 14:39 Type: P Check: 8451 ..
Found using 'seq23' (hayes346.key)
...
49 NKNALVDTSGYNAEVRVGDNVQLNTIYTNDFKLSSGDKLIIVLNNNNILYSAIYENSSV
99 102
109 SFWIKISKDLTNSHNEYTIINSIEQNSGWLKIRNGNIEWILOQDVNRKYSKLIIFYSESLL
125 157
169 SHTGYTNKWFVFTITNNIMGYMKLYINGELKQSQKIEDLDEVKLDKTIIVFGIDENIDENQ
189
229 MLWIRDFNIFSKELSNEDINIVYEGQILNRVVKDYWGPNLKFDTFYTIINDYIDRYIAP
274
289 ESNLLVLVRYPDRSKLYTGNPITIKSVSDKNPYSKILNGDNIILHMLYNSRKYMIIRDTD
321 341
349 TIYATQGECSQNCVYALKQSNLGNYGIGIFSIKNIVSKNKYCSQIFSSPRENTMLLAD
409 IYKWRFTSFKNAYTPVAVTNVETKLLSTSSFPWKTISRDPGWVE
410 421
-----
15 matches found in sequence:
aaw68399 ; Clostridium botulinum type F toxin C fragment.
(from "bt_ags.pep")
TOIG of: aaw68399 check: 8786 from: 1 to: 448
ID AAW68399 standard; protein; 448 AA.
XX
AC AAW68399;
XX
DT 07-DEC-1998 (first entry)
XX
DE Clostridium botulinum type F toxin C fragment.
XX
KW Antitoxin; vaccine; neurotoxin; toxin F; intoxication; immunogen;
KW botulism; BotF.
XX
OS Clostridium botulinum; serotype F strain 202F (ATCC 23387).
OS Synthetic.
XX
```


CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 254 AA;
AAAY30117 Length: 254 August 31, 2004 14:39 Type: P Check: 7360 ..
Found using 'seq23' (hayes346.key)
...
66 GLEWIGRIDPANGNTEYDPKFOGKATITADTSSNTVNLQLSLTSDTAVYYCASGGELG
116
126 FPYWGQTLVTVSAKTPSPVPLAPGSAAQTNMTVLGCLVKGYFPEPVTVTWNSGSL
148
186 SSGVHTFPVAVLQFDLY
...

1 match found in sequence:
aay30118 ; Murine anti-botulinum toxin antibody fragment (BotFab 1) light chain
(from "bt_ags.pep")
TOIG of: aay30118 check: 3248 from: 1 to: 233
ID AAY30118 standard; protein; 233 AA.
XX
AC AAY30118;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 1) light chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
XX Clostridium botulinum; detection.
XX Mus musculus.
XX OS US5932449-A.
XX PN 03-AUG-1999.
XX PD 30-AUG-1999.
XX PF 30-JAN-1997; 97US-00792824.
XX PR 01-FEB-1996; 96US-0011013P.
XX PA (USSA) US SEC OF ARMY.
XX PI Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX DR WPI: 1999-492692/41.
XX DR N-PSDB; AAX86665.
XX PT Detection of botulinum toxin.
XX PS Claim 8; Col 25-26; 24pp; English.
CC This sequence represents the light chain of BotFab 1, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting

CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting
CC botulinum toxins in food and are also useful in health care and in
CC military applications. They are less expensive to produce than monoclonal
CC antibodies as they can be isolated from large scale bacterial cultures.
CC Also, the affinity of an rFab may be altered by mutagenesis of its gene
CC and subsequent screening of the expressed rFabs
XX
SQ Sequence 233 AA;
AAAY30118 Length: 233 August 31, 2004 14:39 Type: P Check: 3248 ..
Found using 'seq23' (hayes346.key)
...
4 LLPTRAAGLLLLAQAQMADIQMTQSPASLSASVGETVITTCRASGNIHNYLAWYQQKQG
54 57
64 KSPQLLVYNKATLADGVPSRFRSGSGSGTQYSLKINSLOPEDFGS
...

3 matches found in sequence:
aay30119 ; Murine anti-botulinum toxin antibody fragment (BotFab 1) heavy chain
(from "bt_ags.pep")
TOIG of: aay30119 check: 7873 from: 1 to: 254
ID AAY30119 standard; protein; 254 AA.
XX
AC AAY30119;
XX
DT 20-OCT-1999 (first entry)
XX
DE Murine anti-botulinum toxin antibody fragment (BotFab 1) heavy chain.
XX
KW Recombinant antibody fragment; rFab; botulinum; neurotoxin;
XX Clostridium botulinum; detection.
XX Mus musculus.
XX OS US5932449-A.
XX PN 03-AUG-1999.
XX PD 30-JAN-1997; 97US-00792824.
XX PR 01-FEB-1996; 96US-0011013P.
XX PA (USSA) US SEC OF ARMY.
XX PI Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX DR WPI: 1999-492692/41.
XX DR N-PSDB; AAX86665.
XX PT Detection of botulinum toxin.
XX PS Claim 8; Col 25-27; 24pp; English.
CC This sequence represents the heavy chain of BotFab 1, a murine
CC recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC and B. A cDNA library was made from mouse mRNA isolated from mice
CC immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC chains were expressed in phage display libraries and screened for their
CC ability to bind to botulinum toxin types A or B. The clones were then
CC isolated and sequenced. Botulinum neurotoxin is produced as several
CC antigenically distinct serotypes (A-G) and is non-covalently associated
CC with non-neurotoxic proteins. The rFab of this invention binds to the non
CC -neurotoxic proteins that are found in neurotoxin complexes A and B. Such
CC antibody fragments are able to act as immunosensors for detecting

```

881  NTLVDTSGYNAEVSEGDVQLNPIFPDFKLGSGEDRGKVIIVTQNEINVMWSESPSI
      |--|
      931  935
941  SFWRINKWVNLPGYTIIDSVKXNSGWSIGIISNFLVFTLKQNEDSRQSINFSDISNN
      |--|
      956
1001  APGYNKMPFFVTVTNNMGMNKIYINGKLDTIKVKELTGINFSKTITPEINKIPDTGLIT
      |--|
      1004
1061  SDSNINWIRDFIIFAKELDKDINILFNSLQYTNVVKDYWGNDLRNRYKYNWIDYL
      |--|
      1074
      1094
1121  NRYMYANSRQIVENTRRNNDNFEGYKIIKKIRGNTNDTRVRGGDILYFDMTINNKAYN
      |--|
      1123
      1146
      1169
      1179
1181  LFMKNETWYADNHSTEDIYATGLREQTKDINDNIIFOIQPMNTTYVASQIFKSNFNGEN
      |--|
      1182
      1225
1241  ISGICSTGYRFRLLGGDWYRNHLYPTVKQGYASLLSESTHMGFPVSE
      |--|
      1273

-----
1 match found in sequence:
aay30116 ; Murine anti-botulinum toxin antibody fragment (BotFab 5) light chai
(from "bt_ags.pep")
TOIG of: aay30116 check: 4781 from: 1 to: 236

ID  AAY30116 standard; protein; 236 AA.
XX
AC  AAY30116;
XX
DT  20-OCT-1999 (first entry)
DE  Murine anti-botulinum toxin antibody fragment (BotFab 5) light chain.
XX
KW  Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW  Clostridium botulinum; detection.
XX
OS  Mus musculus.
XX
PN  US5932449-A.
XX
PD  03-AUG-1999.
XX
PF  30-JAN-1997; 97US-00792824.
XX
PR  01-FEB-1996; 96US-0011013P.
XX
PA  (USSA ) US SEC OF ARMY.
XX
PI  Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX
DR  WPI; 1999-492692/41.
XX
DR  N-PSDB; AAX86664.
XX
PT  Detection of botulinum toxin.
PS  Claim 1; Col 17-20; 24pp; English.
XX
CC  This sequence represents the light chain of BotFab 5, a murine
CC  recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC  and B. A cDNA library was made from mouse mRNA isolated from mice
CC  immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC  chains were expressed in phage display libraries and screened for their
CC  ability to bind to botulinum toxin types A or B. The clones were then
CC  antigenically distinct serotypes (A-G) and is non-covalently associated
CC  with non-neurotoxic proteins. The rFab of this invention binds to the non

-----
2 matches found in sequence:
aay30117 ; Murine anti-botulinum toxin antibody fragment (BotFab 5) heavy chai
(from "bt_ags.pep")
TOIG of: aay30117 check: 7360 from: 1 to: 254

ID  AAY30117 standard; protein; 254 AA.
XX
AC  AAY30117;
XX
DT  20-OCT-1999 (first entry)
DE  Murine anti-botulinum toxin antibody fragment (BotFab 5) heavy chain.
XX
KW  Recombinant antibody fragment; rFab; botulinum; neurotoxin;
KW  Clostridium botulinum; detection.
XX
OS  Mus musculus.
XX
PN  US5932449-A.
XX
PD  03-AUG-1999.
XX
PF  30-JAN-1997; 97US-00792824.
XX
PR  01-FEB-1996; 96US-0011013P.
XX
PA  (USSA ) US SEC OF ARMY.
XX
PI  Burans JP, Emanuel PA, Valdes JJ, Eldefrawi ME;
XX
DR  WPI; 1999-492692/41.
XX
DR  N-PSDB; AAX86664.
XX
PT  Detection of botulinum toxin.
PS  Claim 1; Col 19-20; 24pp; English.
XX
CC  This sequence represents the heavy chain of BotFab 5, a murine
CC  recombinant antibody fragment (rFab) specific to botulinum toxin types A
CC  and B. A cDNA library was made from mouse mRNA isolated from mice
CC  immunised with human pentavalent toxoid. The cloned mouse heavy and light
CC  chains were expressed in phage display libraries and screened for their
CC  ability to bind to botulinum toxin types A or B. The clones were then
CC  antigenically distinct serotypes (A-G) and is non-covalently associated
CC  with non-neurotoxic proteins. The rFab of this invention binds to the non

```

isolated and sequenced. Botulinum neurotoxin is produced as several antigenically distinct serotypes (A-G) and is non-covalently associated with non-neurotoxic proteins. The rFab of this invention binds to the non-neurotoxic proteins that are found in neurotoxin complexes A and B. Such antibody fragments are able to act as immunosensors for detecting botulinum toxins in food and are also useful in health care and in military applications. They are less expensive to produce than monoclonal antibodies as they can be isolated from large scale bacterial cultures. Also, the affinity of an rFab may be altered by mutagenesis of its gene and subsequent screening of the expressed rFabs

Sequence 236 AA;

AAY30116 Length: 236 August 31, 2004 14:39 Type: P Check: 4781
Found using 'seq23' (hayes346.key)

...

4 LLPTAAAGLLLLAQPAMADIQMTQSPASLSASVGETVITTCRASGNIHNYLAWYQKQKG
|--|
54 57

64 KSPQLLVYNKTLADGVPSRFGSGGTQYSLKINSLOPEDFGS

...


```

FH Key Location/Qualifiers
PT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX
XX (OPHI-) OPHIDIAN PHARM INC.
XX
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
XX
XX N-PSDB; AAV30593.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 48; Page 364-365; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (202F strain) type F neurotoxin, encoded by a DNA
CC sequence (see AAV30593) in plasmid pETHisB. This vector can be used to
CC express BotC soluble C fragment in Escherichia coli host cells, with the
CC recombinant C fragment being purified on an affinity column. The
CC invention relates to recombinant proteins derived from C. botulinum
CC toxins, especially type B and type E toxins. Methods are provided which
CC allow for the isolation of soluble recombinant proteins free of
CC significant endotoxin contamination. Preferred hosts for production of
CC recombinant proteins are E. coli, insect cells and yeast cells. The
CC recombinant toxins are used as immunogens for the production of vaccines
CC and antitoxins that are useful in the treatment of humans and animals at
CC risk of intoxication with clostridial toxin
XX
XX Sequence 448 AA;
XX
AAW68399 Length: 448 August 31, 2004 14:39 Type: P Check: 8786 ..
Found using 'seq23' (hayes346.key)
1 MGHHHHHHHHHSSGHIEGRHWSMAILIYFNRLYKKIKOSSILDMRYENKFKIDISGY
36 39
61 GSNISINGVVIYSTNRNQFGIYNSRLSEVNIAQNNDIYNSRYONFSISFWVRIPKHYK
104
121 PMHNHREYTIINCMMGNNSGWKISLRTVRDCEIITWLQDTSGNKENLIFRYBELNRISNY
122 128
171
181 INKWIFVTITNRLGNSRIYNGNLIVKESISNLGDIHVSNDILFKIVGCDDETVGIRY
235 240
241 PKVFNTELDKTEIETLYSNEDPPSILKNWGNLYLNKKYLFNLRLKDKYITLNSGILN
273 280
316
301 INQRGVTEGSFVFNLYKLYGEVVEIIRKNGPIDISNTDNFVRKNDLXINVDVDRGVEYRL
316 348
358
361 YADTKSEKEKIIRTSNLDNSLQGIIVMDSIGNNCTMNFQNNNGNSNIGLLGFHSNNLVASS
361
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421 WYNNIRRTSSNGCFWSSISKENGWKE
423
-----
14 matches found in sequence:
aaw68400 ; Clostridium botulinum type G toxin C fragment.
(from "bt_ags pep")
TOIG of: aaw68400 check: 9903 from: 1 to: 473
ID AAW68400 standard; protein; 473 AA.
XX
XX AAW68400;
XX
XX 07-DEC-1998 (first entry)
XX
XX Clostridium botulinum type G toxin C fragment.
XX
XX Antitoxin; vaccine; neurotoxin; toxin G; intoxication; immunogen;
XX botulism; BotG.
XX
XX Clostridium botulinum; serotype G strain 113/30.
XX
XX Synthetic.
XX
XX Key Location/Qualifiers
FT Peptide 1..21
FT /note= "N-terminal His tag"
XX
XX WO9808540-A1.
XX
XX 05-MAR-1998.
XX
XX 28-AUG-1997; 97WO-US015394.
XX
XX 28-AUG-1996; 96US-00704159.
XX
XX (OPHI-) OPHIDIAN PHARM INC.
XX
XX Williams JA, Thalley BS;
XX
XX WPI; 1998-230234/20.
XX
XX N-PSDB; AAV30596.
XX
XX Host cell containing recombinant expression vector encoding Clostridium
PT botulinum type B or E toxin - useful to treat humans and other animals at
PT risk of intoxication with clostridial toxin.
XX
XX Example 49; Page 376-378; 428pp; English.
XX
XX This is the amino acid sequence of the histidine-tagged C fragment of
CC Clostridium botulinum (113/30 strain) type G neurotoxin, encoded by a DNA
CC sequence (see AAV30596) in plasmid pETHisB. This vector can be used to
CC express BotG soluble C fragment in Escherichia coli host cells, with the
CC recombinant C fragment being purified on an affinity column. The
CC invention relates to recombinant proteins derived from C. botulinum
CC toxins, especially type B and type E toxins. Methods are provided which
CC allow for the isolation of soluble recombinant proteins free of
CC significant endotoxin contamination. Preferred hosts for production of
CC recombinant proteins are E. coli, insect cells and yeast cells. The
CC recombinant toxins are used as immunogens for the production of vaccines
CC and antitoxins that are useful in the treatment of humans and animals at
CC risk of intoxication with clostridial toxin
XX
XX Sequence 473 AA;
XX
AAW68400 Length: 473 August 31, 2004 14:39 Type: P Check: 9903 ..
Found using 'seq23' (hayes346.key)
```

52 RGRLLDSSGYGATWVGSDVIFNDIGNQFKLNNSNSNITAHQSKFVYDSMFNFSI

CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast
XX
SQ Sequence 450 AA;

AAY77136 Length: 450 August 31, 2004 14:39 Type: P Check: 8215 ..
Found using 'seq23' (hayes346.key)

40 NTLVDTSGYNAEYSEGDVQLNPIFPDFDKLGSGEDRGKIVIVTQENIVNYSFESI
90 93 94 97

100 SFWRINKVSNLPFYTIIDSVKXNWSGSGIISNFLVFTLKQNESEQSINFSYISNN
115

160 APGYNKWFVVTNNMGMNKIYINGKLIDTIKVKELTGINFSTTIFINKIPDTGLIT
163

220 SDSDNINMIRDFYIFAKELDKDINDILFNSLOVTVKDWGNDLRYNKEYXVNVNDYL
233 253 271

280 NRYMYANSRQIVENTRRNNDFNEGVKIIIRKIRGNTNDRVRGGDILYFDMTNNKAYN
282 305 328 338

340 LEWKNETWADNHSTEDIYAIGLRQETKDINDNIIFQIPMNNTYVYASQIFKSNFNGEN
341 384

400 ISGICSGTYRFLRGDGYRHNVLVPTKQGNVASLLESTHMGFPVPE
432

12 matches found in sequence:
aay77137 ; Synthetic botulinum neurotoxin serotype E (BoNTE) C-terminal fragment
(from "bt_ags.pep")
TOIG of: aay77137 check: 2298 from: 1 to: 449

ID AAY77137 standard; protein; 449 AA.

XX AC AAY77137;

XX XX 08-MAY-2000 (first entry)

XX DE Synthetic botulinum neurotoxin serotype E (BoNTE) C-terminal fragment.

XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype E; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
XX diagnosis; drug screening.

XX OS Clostridium botulinum.
OS Synthetic.

XX PN WO200002524-A2.

XX PD 20-JAN-2000.

XX FF 09-JUL-1999; 99WO-US015570.

XX XX 10-JUL-1998; 98US-0092416P.

12-MAY-1999; 99US-0133870P.

(USME-) US MEDICAL RES INST INFECTIOUS DISEASES.

XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;

XX WPI; 2000-160827/14.

DR N-PSDB; AAZ87215.

XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
PT toxin serotypes A-G, is used for inducing an immune response against
PT botulinum.

XX Claim 26; Page 43-44; 54pp; English.

XX The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast

XX Sequence 449 AA;

AAY77137 Length: 449 August 31, 2004 14:39 Type: P Check: 2298 ..
Found using 'seq23' (hayes346.key)

...

52 MRYKNDKYVDTSGYSDNININGDVYKYPKNQFGIYNDKLTETINISQNDYIIYDNKYKN
102 109

112 FSISFWVRIPNYDNKIYVNVNEYTIINCMDNNNGMKVSLNHNEIITWTLQDNAGINQKLA
112 134

172 FNYGNANGISDYINKWIFVTIITNDRGLGSKLYINGNLIDQKSIILNLGNTHVSDNHLFKIV
174

232 NCSTYRIGIRYENIFDKELDETEIQTLYSNPNTILKDFWGNVLLYDKETYLNLVLP
235 243 276 283

292 NNFIDRRKDTLSINNIRSTILLANRLYSKIKVQIQRVNNSSSTNDNLVKNQDVYINFA
319 346

352 SKTHLPPLYADTATTNKEKTIKISSGNREFNQVVMVNSVGNNTWFKNNNGNIGLLGF

412 KADTVVASTWYTYTHMRDHTNSGCFWNFISEHGWQEK
423

12 matches found in sequence:
aay77138 ; Synthetic botulinum neurotoxin serotype F (BoNTF) C-terminal fragment
(from "bt ags.pep")
TOIG of: aay77138 check: 7414 from: 1 to: 432

ID AAY77138 standard; protein; 432 AA.
XX AAY77138;
AC
XX
DT 08-MAY-2000 (first entry)
XX
DE Synthetic botulinum neurotoxin serotype F (BoNTF) C-terminal fragment.
XX
KW Botulinum neurotoxin; heavy chain; BoNT; serotype F; C-terminal fragment;
KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
KW diagnosis; drug screening.
XX
OS Clostridium botulinum.
OS Synthetic.
XX
XX WO200002524-A2.
XX
XX 20-JAN-2000.
XX
XX 09-JUL-1999; 99WO-US015570.
XX
XX 10-JUL-1998; 98US-0092416P.
XX
XX 12-MAY-1999; 99US-0133870P.
XX
XX (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87216.
XX
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX
XX Claim 27; Page: 54pp; English.

CC The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. Sequences AAY77134-Y77139 represent synthetic BoNT Hc
CC fragments used in the present invention. The DNA encoding these sequences
CC had been optimised for codon usage for expression in yeast. Note: This
CC sequence is not given in the specification, but is decoded from the BoNTF
CC Hc DNA sequence given on pages 45-46

XX Sequence 432 AA;

XX AAY77138 Length: 432 August 31, 2004 14:39 Type: P Check: 7414
XX Found using 'seq23' (hayes346.key)

1 MSYTNKILILYFNKLYKKIDNSILDYNNKFNKIDISGYSNISINGDVYIYSTRNQ

17 20

61 FGIYSSKPSVNTAQNNDIIVNGRYQNFMSFWRIKPYFNKNVLANNEYTIIDCIRNNS
85 88
121 GWKISLNYNKLIIWTLODTAGNNOKLVFNVTMISISDYINKWIFVTITNNRLGNSRIYIN
128 149
181 GNLIDEKSISNLGDIHSDNLFKIVGNCNDRYVIGIRYFKVFDTELKTEIETLYSDEPD
213 218
241 PSILKDFWGYLLNKKYLYLLNLLRTDKSITQNSNLFNINQORGYQKPNFISNTRLYTG
251 258
301 VEFIIRKNGSTDISNTDNFVRKNDLAYINVVDRDVEYRLNADISIAKEPIKILRTSNS
301 327
361 NNSLGQIIVMSIGNNCTMNFQNNNGNIGLLGFHSNNLVASSWYNNIRKNTSSNGCFW
406
421 SPISKEHGWQEN

14 matches found in sequence:
aay77139 ; Synthetic botulinum neurotoxin serotype G (BoNTG) C-terminal fragment
(from "bt ags.pep")
TOIG of: aay77139 check: 8247 from: 1 to: 449
ID AAY77139 standard; protein; 449 AA.
XX
XX AC AAY77139;
XX
XX DT 08-MAY-2000 (first entry)
XX
XX DE Synthetic botulinum neurotoxin serotype G (BoNTG) C-terminal fragment.
XX
XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype G; C-terminal fragment;
XX KW Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
XX KW diagnosis; drug screening.
XX
XX OS Clostridium botulinum.
XX OS Synthetic.
XX
XX PN WO200002524-A2.
XX
XX PD 20-JAN-2000.
XX
XX PF 09-JUL-1999; 99WO-US015570.
XX
XX PR 10-JUL-1998; 98US-0092416P.
XX
XX PR 12-MAY-1999; 99US-0133870P.
XX
XX PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX
XX PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX WPI; 2000-160827/14.
XX N-PSDB; AAZ87217.
XX
XX Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX
XX Claim 28; Page 47-48; 54pp; English.
XX
XX The invention relates to novel vaccines that induce a protective immune
XX response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F

and G (BoNTA-BoNTG): The vaccine of the invention is novel recombinant DNA construct comprising a vector, and at least one nucleic acid fragment comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-G. In preferred embodiments of the invention, the vector is a Venezuelan equine encephalitis virus (VEE) replicon vector. Use of this vector results in the production of large amounts of a protein encoded by a sequence cloned into the replicon. The constructs are used to produce vaccines against botulism. The proteins can also be used as diagnostic tools for the diagnosis of botulism. The transformed host cells can be used to analyse the effectiveness of drugs and agents which inhibit toxin effects. The vaccine currently used against botulism is dangerous and expensive to produce, and contains formalin, which is very painful for the recipient. Also, the vaccine is incomplete, in that only 5 of the 7 serotypes are represented in the formulation. The novel vaccine of overcomes these problems, as it is easily purified, and available in large quantities. It is also expressed in the lymph nodes for a better immune response. Sequences AAY7134-I77139 represent synthetic BoNT Hc fragments used in the present invention. The DNA encoding these sequences had been optimised for codon usage for expression in yeast.

28 RGGRLIDSSGYGATMNVGSDVIFNDIGNGQFKLNSENSENITAHQSFVWYDSMFDFNSI
| -- | 78 81

88 |--|
NEWVTPKYNNNDIQTYLQNEYTIISCIKNDSGWKVSIGKNRIIWTLLIDVNAKSISIFFE
109

148 YSIKDNI SDYINKWF

208 TDTTFVWIKDFNIFGRELNATEVSSLYWIOSSTNTLKDFWGNPLRYDTQYVLFNQGMQN }--| 258

268	---	---	---	---	---
	IYKYFSAKMGETAFTFNNA	INYNQYLGLRFTTKAS	NRNINNDNVREGVY		
269		294	294	325	
			298	327	

328 LNIDNIDSESRVVLVNSKEIQTLFIAPINDDPTFVDVLQIKKYVEKTTYNCQILCEK 328 338 365

330
341

DTKTFGLGIGKFKYGVWDTDYNFCISQWYLRISENINKRLGCNQFIPTVDEGW
404 411 414

448 TE

```

19 matches found in sequence:
  aay77140 ; Native botulinum neurotoxin serotype A (BoNTA).
    (from "bt_ags.pep")
  TOIG of: aay77140 check: 6165 from: 1 to: 837

```

ID AAY77140 standard; protein; 837 AA.

XX
AC
AA77140:

XX

08-MAY-2000 (first entry)

Native botulinum neurotoxin serotype A (BoNTA).

Botulinum neurotoxin; heavy chain; BoNT; serotype A;
Venezuelan equine encephalitis virus replicon; VEE; botulism; vaccine;
diagnosis; drug screening.

Clostridium botulinum.

Key Location/Qualifiers
Misc-difference 837 /note= "Apparently encoded by GGATGGGAG AAAGGCCACT G"

WO200002524-A2.

20-JAN-2000.

09-JUL-1999; 99WO-US015570.

10-JUL-1998; 98US-0092416P.
12-MAY-1999; 99US-0133870P.

(USME-) US MEDICAL RES INST INFECTIOUS DISEASES.

Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
WFI; 2000-160827/14.
N-PSDB; AA287218.

121 EALLNPSRVYTFSSDYVKVKNKATEAAMFLGWVEQLVYDFDETSEVSTTDKIADITII
130

```
181 IPY
...
207 GAVILLEFPIEIPAIVLGTALVSYIAKVLTVQIDNALSKRNEKWEVYKYIVTNWLA
257
267 KVNQTQIDLLIRKKMEALENAQAEATKAIINYQNOYTBEEKNNINFNIDDLSSKLNESINK
298
327 AMININKFLNQC SVSYLMNSMIPYG
...
431 ESNHLIDLRYASKINIGSKVNFDPIDKKNQIQLFNLESSKIEVILKNAIVNSMYENPST
481 485
491 SFWRIRPKYFNSISLNNFYTIINCMMENNSGKVSINYEIITWLTQDTEIKORVVFKYSQ
509 527
551 MINISDYINRWIFVITITNNRLNNSKIYINGRLIDQKPIISNLGNIHASNNIMFKLDGCRDT
551
611 HRYIWKYFNLFDKELNEKEIKOLYDNQSNGLKDPFGDVLQYDKPYMLNLYDPNKYV
613 618 651 658 669
671 DVNNGVIRGYMYLKGPRGSVMVTITNLYNSSLYRGTKFIKKYASGNKONIVRNNDRVYN
672 680 728
731 VVVKNKYRLATNASQAGVEKILSALEIPDVGNLSQVVMVMSKNDQGITNKCKMNLQDNN
731 738
791 G
...
-----
6 matches found in sequence:
aay77141; Native botulinum neurotoxin serotype A (BoNTA) N-terminal fragment
(from "bct_ags.pep")
TOIG of: aay77141 check: 3926 from: 1 to: 407

ID AAY77141 standard; protein; 407 AA.
XX
AC AAY77141;
XX
DT 08-MAY-2000 (first entry)
XX
DE Native botulinum neurotoxin serotype A (BoNTA) N-terminal fragment (Hn).
XX Botulinum neurotoxin; heavy chain; BoNT; serotype A; N-terminal fragment;
KW Hn; Venezuelan equine encephalitis virus replicon; VEE; botulism;
KW vaccine; diagnosis; drug screening.
XX
OS Clostridium botulinum.
XX
PN WO200002524-A2.
XX
PD 20-JAN-2000.
XX
PF 09-JUL-1999; 99WO-US015570.
XX
```

```
10-JUL-1998; 98US-0092416P.
12-MAY-1999; 99US-0133870P.
(USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
WPI; 2000-160827/14.
N-PSDB; AAZ87219.
Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
toxin serotypes A-G, is used for inducing an immune response against
botulinum.
Example 3; Page 51; 54pp; English.
The invention relates to novel vaccines that induce a protective immune
response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
DNA construct comprising a vector, and at least one nucleic acid fragment
comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
G. In preferred embodiments of the invention, the vector is a Venezuelan
equine encephalitis virus (VEE) replicon vector. Use of this vector
results in the production of large amounts of a protein encoded by a
sequence cloned into the replicon. The constructs are used to produce
vaccines against botulism. The proteins can also be used as diagnostic
tools for the diagnosis of botulism. The transformed host cells can be
used to analyse the effectiveness of drugs and agents which inhibit toxin
effects. The vaccine currently used against botulism is dangerous and
expensive to produce, and contains formalin, which is very painful for
the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
serotypes are represented in the formulation. The novel vaccine of
overcomes these problems, as it is easily purified, and available in
large quantities. It is also expressed in the lymph nodes for a better
immune response. The present sequence represents the native BoNTA heavy
chain N-terminal fragment (Hn) used in an exemplification of the present
invention
Sequence 407 AA;
AAY77141 Length: 407 August 31, 2004 14:39 Type: P Check: 3926 ..
Found using 'seq23' (hayes346.key)
1 MIKVNNDLFFSPSDNFTNDLNGKEITSDTNEAEENISLDLIQQYYLTFNFDNEPE
50 53
61 NISINLSSDIIGQLELMPNIEFPNGKKYELDKYTMFHYLRAQEFHCKSKRIALTNSVN
95 98 103
121 EALLNPSRVYTFSSDYKVKVNKATEAAMFLGWVQLVYDFDTESEVSTTDKIADITII
130
181 IPY
...
207 GAVILLEFPIEIPAIVLGTALVSYIAKVLTVQIDNALSKRNEKWEVYKYIVTNWLA
257
267 KVNQTQIDLLIRKKMEALENAQAEATKAIINYQNOYTBEEKNNINFNIDDLSSKLNESINK
298
327 AMININKFLNQC SVSYLMNSMIPYG
...
-----
13 matches found in sequence:
```


aa77142 ; Native botulinum neurotoxin serotype A (BoNTA) C-terminal fragment
(from "bt ags.pep")
TOIG of: aa77142 check: 4382 from: 1 to: 432

ID AAY77142 standard; protein; 432 AA.
XX AAY77142;
XX AC
XX DT 08-MAY-2000 (first entry)
XX DE Native botulinum neurotoxin serotype A (BoNTA) C-terminal fragment (Hc).
XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype A: C-terminal fragment;
XX KW Hc; Venezuelan equine encephalitis virus replicon; VEE; botulism;
XX KW vaccine; diagnosis; drug screening.
XX OS Clostridium botulinum.
XX FH
XX FT Key Location/Qualifiers
XX FT Misc-difference 432 /note= "Apparently encoded by GGATGGGAG AAAGGCCACT G"
XX FT
XX PN WO200002524-A2.
XX PD 20-JAN-2000.
XX PF 09-JUL-1999; 99WO-US015570.
XX PR 10-JUL-1998; 98US-0092416P.
XX PR 12-MAY-1999; 99US-0133870P.
XX PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX DR WPI; 2000-160827/14.
XX DR N-PSDB; AAZ87220.
XX PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX PT toxin serotypes A-G, is used for inducing an immune response against
XX PT botulinum.

Example 3; Page 52; 54pp; English.

The invention relates to novel vaccines that induce a protective immune response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant DNA construct comprising a vector, and at least one nucleic acid fragment comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-G. In preferred embodiments of the invention, the vector is a Venezuelan equine encephalitis virus (VEE) replicon vector. Use of this vector results in the production of large amounts of a protein encoded by a sequence cloned into the replicon. The constructs are used to produce vaccines against botulism. The proteins can also be used as diagnostic tools for the diagnosis of botulism. The transformed host cells can be used to analyse the effectiveness of drugs and agents which inhibit toxin effects. The vaccine currently used against botulism is dangerous and expensive to produce, and contains formalin, which is very painful for the recipient. Also, the vaccine is incomplete, in that only 5 of the 7 serotypes are represented in the formulation. The novel vaccine of overcomes these problems, as it is easily purified, and available in large quantities. It is also expressed in the lymph nodes for a better immune response. The present sequence represents the native BoNTA heavy chain C-terminal fragment (Hc) used in an exemplification of the present invention

Sequence 432 AA;

AA77142 Length: 432 August 31, 2004 14:39 Type: P Check: 4382 ..
Found using 'seq23' (hayes346.key)

26 ESNHLIDLSRVASKINIGSKVNFDPIDKNQIQLFNLESSKIEVILKNAIVNSYENFST
76 79 80 83
86 SFWIRIPKYNFNSISLNNEYTTIICMNNENSGKVSILNTEIITWTQDTQETIKQRVVFKYSQ
104 122 143
146 MINISDVINRWIFVTITNNRLNNSKIYINGRLIDQKPISNLGNHASNIMFKLDGCRDT
146
206 HRYTIWKYFNLFDKELNEKEIKDLYDNQNSGILKDFWGDYLODYKPYMLNLYDPNKYV
208 213 246 253 264
266 DVNNVGIRGVMYILKPRGVSMTTNIYINSSLYRGTKFIKKYASGNKDNIVRNNDRVYN
267 275 323
326 VVYKNKEYRLATNASQAGVEKILSALEIPDVGNLSQVVVMKSKNDQGITNKKRNLODNN
326 333
386 G

7 matches found in sequence:

aa77143 ; Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment A sub
(from "bt ags.pep")
TOIG of: aa77143 check: 9357 from: 1 to: 233

ID AAY77143 standard; protein; 233 AA.

XX AAY77143;
XX AC
XX DT 08-MAY-2000 (first entry)
XX DE Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment A subHc1.
XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype A;
XX KW C-terminal subfragment; Hc; botulism; VEE;
XX KW Venezuelan equine encephalitis virus replicon; vaccine; diagnosis;
XX KW drug screening.
XX OS Clostridium botulinum.
XX OS Synthetic.
XX PN WO200002524-A2.
XX PD 20-JAN-2000.
XX PF 09-JUL-1999; 99WO-US015570.
XX PR 10-JUL-1998; 98US-0092416P.
XX PR 12-MAY-1999; 99US-0133870P.
XX PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX DR WPI; 2000-160827/14.
XX DR N-PSDB; AAZ87221.

Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum toxin serotypes A-G, is used for inducing an immune response against botulinum.

Disclosure; Page 53; 54pp; English.

```

XX CC The invention relates to novel vaccines that induce a protective immune
CC response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
CC and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
CC DNA construct comprising a vector, and at least one nucleic acid fragment
CC comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
CC G. In preferred embodiments of the invention, the vector is a Venezuelan
CC equine encephalitis virus (VEE) replicon vector. Use of this vector
CC results in the production of large amounts of a protein encoded by a
CC sequence cloned into the replicon. The constructs are used to produce
CC vaccines against botulism. The proteins can also be used as diagnostic
CC tools for the diagnosis of botulism. The transformed host cells can be
CC used to analyse the effectiveness of drugs and agents which inhibit toxin
CC effects. The vaccine currently used against botulism is dangerous and
CC expensive to produce, and contains formalin, which is very painful for
CC the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
CC serotypes are represented in the formulation. The novel vaccine of
CC overcomes these problems, as it is easily purified, and available in
CC large quantities. It is also expressed in the lymph nodes for a better
CC immune response. The present sequence represents BoNTA heavy chain C-
CC terminal subfragment AsubHc1, comprising residues 1 to 233 of the BoNTA
CC Hc fragment, and was used in the present invention
XX SQ Sequence 233 AA;
AAAY77143 Length: 233 August 31, 2004 14:39 Type: P Check: 9357 ..
Found using 'seq23' (hayes346.key)
...
26 ESNHLIDLSRYASKINGSKVNFDPIDKXQIQLFNLESSEKIEVLKNAIVNSMVNEFST
76 79
80 83
86 SFWIRIPKYNISLNNYTYTLINCNNNSGKWSLVNLYGELLITLQDTQEIQRVVFQYSQ
104 122 143
146 MINISDYINRWTFVTITNNLNNKIYINGRLIDQKPISNLGNTHASNNIMPKLDGCRDT
146
206 HRYIWIYKFNLPDKELNEKEIKDLYDNQ
208 213
-----
6 matches found in sequence:
aay77144 ; Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment Asub
(from "bt_ags.pep")
TOIG of: aay77144 check: 640 from: 1 to: 206
ID AAY77144 standard; protein; 206 AA.
XX AC AAY77144;
XX AC AAY77144;
XX DT 08-MAY-2000 (first entry)
XX DE Botulinum neurotoxin serotype A (BoNTA) C-terminal subfragment AsubHc2.
XX KW Botulinum neurotoxin; heavy chain; BoNT; serotype A;
XX KW C-terminal subfragment; Hc; botulism; VEE;
XX KW Venezuelan equine encephalitis virus replicon; vaccine; diagnosis;
XX OS Clostridium botulinum.
XX OS Synthetic.
XX PN WO200002524-A2.
XX DE 20-JAN-2000.
XX PD

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XX PF 09-JUL-1999; 99WO-US015570.
XX PR 10-JUL-1998; 98US-0092416P.
XX PR 12-MAY-1999; 99US-0133870P.
XX PA (USME-) US MEDICAL RES INST INFECTIOUS DISEASES.
XX PI Lee JS, Pushko P, Smith JF, Parker M, Dertzbaugh MT, Smith L;
XX PR 2000-160827/14.
XX PR N-PSDB; AAZ87222.
XX PT Novel Botulinum neurotoxin vaccine comprising a fragment from botulinum
XX toxin serotypes A-G, is used for inducing an immune response against
XX botulinum.
XX PS Disclosure; Page 53; 54pp; English.
XX CC The invention relates to novel vaccines that induce a protective immune
XX response against botulinum neurotoxin (BoNT) serotypes A, B, C, D, E, F
XX and G (BoNTA-BoNTG). The vaccine of the invention is novel recombinant
XX DNA construct comprising a vector, and at least one nucleic acid fragment
XX comprising a C-terminal heavy chain fragment (Hc) from BoNT serotypes A-
XX G. In preferred embodiments of the invention, the vector is a Venezuelan
XX equine encephalitis virus (VEE) replicon vector. Use of this vector
XX results in the production of large amounts of a protein encoded by a
XX sequence cloned into the replicon. The constructs are used to produce
XX vaccines against botulism. The proteins can also be used as diagnostic
XX tools for the diagnosis of botulism. The transformed host cells can be
XX used to analyse the effectiveness of drugs and agents which inhibit toxin
XX effects. The vaccine currently used against botulism is dangerous and
XX expensive to produce, and contains formalin, which is very painful for
XX the recipient. Also, the vaccine is incomplete, in that only 5 of the 7
XX serotypes are represented in the formulation. The novel vaccine of
XX overcomes these problems, as it is easily purified, and available in
XX large quantities. It is also expressed in the lymph nodes for a better
XX immune response. The present sequence represents BoNTA heavy chain C-
XX terminal subfragment AsubHc2, comprising residues 234 to 438 of the BoNTA
XX Hc fragment plus an initia methionine, and was used in the present
XX invention
XX SQ Sequence 206 AA;
AAAY77144 Length: 206 August 31, 2004 14:39 Type: P Check: 640 ..
Found using 'seq23' (hayes346.key)
1 MSNSGILKDFWGDYLDQYKPYIYMLNLYDPNKYVDVNNVNGIRGYMYLKGRGSMVTNIYL
14 17 21 24 32 35 43 46
61 NSSLYRGTKFIKKYASGNKDNVNRNDRVIVNVVKNKYEIRLATNASQAGVEKILSALE
91 94 101
121 IPDVGNLSQVVVVMKSKNDQGITNCKMNLQDNNG
...
-----
10 matches found in sequence:
aay78982 ; C. botulinum type D toxin amino acid sequence.
(from "bt_ags.pep")
TOIG of: aay78982 check: 2461 from: 1 to: 399
ID AAY78982 standard; protein; 399 AA.
XX AC AAY78982;
XX AC AAY78982;
XX DT 20-JUN-2000 (first entry)
XX DE C. botulinum type D toxin amino acid sequence.
XX PD

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XX The sequence represents a the C-terminus of the wildtype botulinum toxin
 CC type A light chain. The invention relates to a novel modified neurotoxin
 CC including a structural modification, where the structural modification is
 CC effective to alter the biological persistence, or biological activity.
 CC The modified neurotoxin is useful for treating spasmodic dysphonia,
 CC laryngeal dystonia, oromandibular dysphonia, lingual dystonia, cervical
 CC spasm, eyelid disorder, cerebral palsy, focal spasticity, spasmodic
 CC colitis, neurogenic bladder, anismus, limb spasticity, tics, tremors,
 CC bruxism, anal fissure, achalasia, dysphagia, lacrimation, hyperhidrosis,
 CC excessive salivation, excessive gastrointestinal secretions, pain from
 CC muscle spasms, headache pain, brow furrows or skin wrinkles
 XX Sequence 27 AA;
 SQ

AB880663 Length: 27 August 31, 2004 14:39 Type: P Check: 8911 ..
 Found using 'seq23' (hayes346.key)

1 NFTKLNFTGLFEFYKLLCVRGIITSK
 15 18

 11 matches found in sequence:
 abg69067 ; Botulinum neurotoxin light chain polypeptide #1.
 (from "bt_ags.pep")
 TOIG of: abg69067 check: 9465 from: 1 to: 461

ID ABG69067 standard; protein; 461 AA.
 XX
 AC ABG69067;
 XX
 DT 07-OCT-2002 (first entry)
 XX
 DE Botulinum neurotoxin light chain polypeptide #1.
 XX
 KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX
 OS Clostridium botulinum.
 XX
 FN WO200236758-A2.
 XX
 PD 10-MAY-2002.
 XX
 PF 06-NOV-2001; 2001WO-US047230.
 XX
 PR 06-NOV-2000; 2000US-0246774P.
 PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-0311966P.
 XX
 PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX
 PI Smith LA, Jensen M;
 XX
 DR WPI; 2002-575192/61.
 DR N-PSDB; ABK98537.
 XX
 PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX
 PS Claim 52; Page 118-119; 166pp; English.
 XX
 CC The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% The BoNT LC protein is

CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX Sequence 461 AA;
 SQ

ABG69067 Length: 461 August 31, 2004 14:39 Type: P Check: 9465 ..
 Found using 'seq23' (hayes346.key)

1 MVQFVNKQFNKDPVNGVDIAYIKIPNVGQMPVKAFKIHKINWIPERDTFTNPEEGDL
 22 25

 61 NPPPEAKQVFSYYD
 ...

136 INVIQDGSYRSEELNLVIIGPSADIIQFECKSGHEVLNLTNRNGYSTQYIRFSPDFTF
 186

 196 GFESLEVDTPNLLGAGKATDPAVTLAHLIHAHRLVGIAINPNRVFKVNTNAYEYS
 234

 256 GLEVSFEELRTFGHDAKFDISLQENEFRLYYNFKFDIASTLNKAKSIVGTTASLQYMK
 288

 316 NVFKEKLLSEDTSGKFSVDKLFKLYKMLTEIYTEDNFVFKFKVLNRKTYLNFDKAVF
 343

 376 KINIVPKVNTIYDGNLNRNLNLAANFNQNTENNMTKLKNFTGLFPEFYKLLCVRGI
 385

 436 ITSKTKSLDKGYNKLVPRSGSHHHHH
 447

7 matches found in sequence:
 abg69068 ; Botulinum neurotoxin light chain polypeptide #2.
 (from "bt_ags.pep")
 TOIG of: abg69068 check: 9222 from: 1 to: 441

ID ABG69068 standard; protein; 441 AA.
 XX
 AC ABG69068;
 XX
 DT 07-OCT-2002 (first entry)
 XX
 DE Botulinum neurotoxin light chain polypeptide #2.
 XX
 KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX
 OS Clostridium botulinum.
 XX
 FN WO200236758-A2.

TOIG of: abg69069 check: 9291 from: 1 to: 444

ID ABG69069 standard; protein; 444 AA.

AC ABG69069;

XX 07-OCT-2002 (first entry)

DE Botulinum neurotoxin light chain polypeptide #3.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;

KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;

KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;

KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;

KW lower motor neuron hyperactivity; autonomic nerve function; muscular;

KW immunostimulant; antibacterial.

XX Clostridium botulinum.

OS WO200236758-A2.

XX 10-MAY-2002.

XX 06-NOV-2001; 2001WO-US047230.

PF 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

XX Smith LA, Jensen M;

XX WPI: 2002-575192/61.

DR N-PSDB; ABK98539.

XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain

PT serotype A, useful for producing the neurotoxin for vaccination against

PT botulism, comprises sequence expressible in host other than Clostridium.

XX Claim 33; Page 121-122; 166pp; English.

XX The invention relates to a nucleic acid molecule encoding a botulinum

CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence

CC that is expressible in a host organism other than Clostridium, or has a

CC total A+T content that is less than about 70% The BoNT LC protein is

CC useful in vaccination against botulism, for eliciting protective immunity

CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,

CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental

CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,

CC conditions characterised by hyperactivity of the lower motor neuron, and

CC to control autonomic nerve function or tiptoe-walking due to stiff

CC muscles common in children with cerebral palsy. The sequences are also

CC useful for screening for botulinum neurotoxin inhibitors. This sequence

CC represents a botulinum neurotoxin light chain serotype A protein

XX Sequence 441 AA;

ABG69068 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..

Found using 'seq23' (hayes346.key)

1 MPVTINNFYNDPIDNNILMMEPPFARGTGYKAFKITDRWIIPERTFYGKPEDFN

33 36

34 37

61 KSSGIFNRDVCYDYPDYLTNDKKNI

149 BRKKGIFANLIIFGPGVLNENETIDIGIONHFASREGGGMQMKFCPEYVSFVNVQ

199

209 NKGASIFNRRGYFSDPALILMHELIHVLHGLYGIKVDDLPVIVPNEKKFFMQSTDAIQABE

269 LYTFGGQPSIITPSTDKSIYDKVLQNFPRGIVDRNLKVLVCISDPNININIKNFKDY

289

329 KVEVSEGGKSIDVSEFDFKLYKSLMFGFTTETNAENYKIKTRASFYSDSLPPVKIKNLLD

331

389 NEITYTIEEGNISDKDMEKEYRGONKAINKQAYEEISKEHLAVYKIQMCKSVK

421

9 matches found in sequence:

abg69069 ; Botulinum neurotoxin light chain polypeptide #3.

(from "bt_ags.pep")

10-MAY-2002.

06-NOV-2001; 2001WO-US047230.

06-NOV-2000; 2000US-0246774P.

20-JUL-2001; 2001US-00910186.

09-AUG-2001; 2001US-0311966P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Jensen M;

WPI: 2002-575192/61.

N-PSDB; ABK98538.

Novel nucleic acid molecule encoding botulinum neurotoxin light chain

serotype A, useful for producing the neurotoxin for vaccination against

botulism, comprises sequence expressible in host other than Clostridium.

Claim 33; Page 119-120; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum

neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence

that is expressible in a host organism other than Clostridium, or has a

total A+T content that is less than about 70% The BoNT LC protein is

useful in vaccination against botulism, for eliciting protective immunity

in a mammal, for treating dystonias, spasticity, pain, ocular motility,

facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental

myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,

conditions characterised by hyperactivity of the lower motor neuron, and

to control autonomic nerve function or tiptoe-walking due to stiff

muscles common in children with cerebral palsy. The sequences are also

useful for screening for botulinum neurotoxin inhibitors. This sequence

represents a botulinum neurotoxin light chain serotype A protein

Sequence 441 AA;

ABG69069 Length: 444 August 31, 2004 14:39 Type: P Check: 9291 ..

Found using 'seq23' (hayes346.key)

INPSVIITGPENIIDPETSTFKLTNNTFAAQEGFGALSIIISIPRFLMTYSNATNDVGE

202

212 GRPSKSEFCMDPILILMHEINHAMNLIAPNDQTISSVTNSIFYSQYKLVLEAEIY

239

272 AFGGPTIDILPKSARKYFBEKALDYRSIAKRLNSTITTANPSSFNKYIGEYKQKLRKYR

258

267

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332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

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Found using 'seq23' (hayes346.key)
1 MTWPVQDNYSQDPVNDNDILYRIPQNKLIITPVKAFMITQNTWVWIPERFSSDTNPSLSK
61 PPRPTSKYQSYDPSYLSSTDQKDTFLKGIILFKRINERDYGKLIINLVVGVSPFMGDS
121 STPEDTFDFTHTTNIATVKEKENGSKVNTIITPSVLIFGEL
...
246 DKRLRPQVSEGFPSQDGNVQFELYTFGGDLVETIQLERSQLREKALGHYKDIKRLNN
306 INKTIPSSWISNIDKYKFIKSEKYNFKDNTGNFVNIDKFNLSYSLTNTVMSEVYSSQ
366 YNVKNTHTYFSRHYLPVPANILDDNIYTIIRDGNLTNKGFNENSGQNIERNPALQKLSS
426 ESVVDLF
...
6 matches found in sequence:
abg69071 ; Botulinum neurotoxin light chain polypeptide #5.
(from "bt ags.pep")
TOIG of: abg69071 check: 3357 from: 1 to: 422

ID ABG69071 standard; protein; 422 AA.
XX AC ABG69071;
XX AC ABG69071;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #5.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
XX KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
XX KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
XX KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
XX KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
XX KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98540.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
XX PT serotype A, useful for producing the neurotoxin for vaccination against
XX PT botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 33; Page 123-124; 166pp; English.
XX CC The invention relates to a nucleic acid molecule encoding a botulinum
XX CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX CC that is expressible in a host organism other than Clostridium, or has a
XX CC total A+T content that is less than about 70% The BoNT LC protein is
XX CC useful in vaccination against botulism, for eliciting protective immunity
XX CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX CC conditions characterised by hyperactivity of the lower motor neuron, and
XX CC to control autonomic nerve function or tiptoe-walking due to stiff
XX CC muscles common in children with cerebral palsy. The sequences are also
XX CC useful for screening for botulinum neurotoxin inhibitors. This sequence
XX CC represents a botulinum neurotoxin light chain serotype A protein
XX SQ Sequence 441 AA;

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10-MAY-2002.
06-NOV-2001; 2001WO-US047230.
06-NOV-2000; 2000US-0246774P.
20-JUL-2001; 2001US-00910186.
09-AUG-2001; 2001US-0311966P.
(USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
Smith LA, Jensen M;
WPI; 2002-575192/61.
N-PSDB; ABK98542.
Novel nucleic acid molecule encoding botulinum neurotoxin light chain serotype A, useful for producing the neurotoxin for vaccination against botulism, comprises sequence expressible in host other than Clostridium.
Claim 33; Page 127-128; 166pp; English.
The invention relates to a nucleic acid molecule encoding a botulinum neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence that is expressible in a host organism other than Clostridium, or has a total A+T content that is less than about 70% The BoNT LC protein is useful in vaccination against botulism, for eliciting protective immunity in a mammal, for treating dystonias, spasticity, pain, ocular motility, facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles, conditions characterised by hyperactivity of the lower motor neuron, and to control autonomic nerve function or tiptoe-walking due to stiff muscles common in children with cerebral palsy. The sequences are also useful for screening for botulinum neurotoxin inhibitors. This sequence represents a botulinum neurotoxin light chain serotype A protein
XX Sequence 436 AA;
ABG69072 Length: 436 August 31, 2004 14:39 Type: P Check: 7590 ..
Found using 'seq23' (hayes346.key)
1 MPVAINSFNVDPVNDTILYMOIPVEEKSKYKAFELMRNVIIERTNICTGTFDFDP
161 PASLKGSSAYDPNLYLTDAEKDRYL
...
235 YGARGVTYEETIEVQAPLIAEKPIRLSEFLTFGGQDLNITSAMKEKLYNNLLANVEK
285 292
295 IATRLSEVNSGAPPEYDINEYKDFQWKYGLDKNADSGYTVNENKSNIEYKKLYSFTESDL
295 314 317
355 ANKFVKCRNTYFIKVEFLKVPNLDDDDIYTVSEGFNIGNLAVNRGQSIKLNPKIIDSP
370
415 DKGLVEKIV
...
-----
10 matches found in sequence:
abg69073 ; Botulinum neurotoxin light chain polypeptide #7.
(from "bnt ags.pep")
TOIG of: abg69073 check: 6299 from: 1 to: 439

```

ID XX ABG69073 standard; protein; 439 AA.
 AC XX ABG69073;
 DT 07-OCT-2002 (first entry)
 DE XX Botulinum neurotoxin light chain polypeptide #7.
 DE XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW XX spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW XX bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW XX cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW XX lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW XX immunostimulant; antibacterial.
 XX OS Clostridium botulinum.
 XX FN WO200236758-A2.
 XX PD 10-MAY-2002.
 XX PF 06-NOV-2001; 2001WO-US047230.
 XX PR 06-NOV-2000; 2000US-0246774P.
 XX PR 20-JUL-2001; 2001US-00910186.
 XX PR 09-AUG-2001; 2001US-0311966P.
 XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX PI Smith LA, Jensen M;
 XX WPI; 2002-575192/61.
 XX N-PSDB; ABK98543.
 XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX Claim 33; Page 129-130; 166pp; English.
 XX The invention relates to a nucleic acid molecule encoding a botulinum
 XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70%. The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX Sequence 439 AA;
 ABG69073 Length: 439 August 31, 2004 14:39 Type: P Check: 6299 ..
 Found using 'seq23' (hayes346.key)

237 GLYGIKISNLPTNTKEFFMQHSDPVOAEELYTFGGHDPSPVSPSTDMNINXKALQNFQD
 287
 297 TANRLNIVSSAQQSGIDISLYKQIKYKNKYDFVEDPNGKYSVDKDKFKLYKALMEFGFTET
 317 325 346
 357 NLAGSYGIKTRYSYSEVSEYLPPIKTEKLLDNTIYTQNEGFNIASKNLKNEFNGQNKAVNKE
 368
 417 AYEISLEHLVIVIRIAMCKPVNY
 418 429

 7 matches found in sequence:
 abg69074 ; Botulinum neurotoxin light chain polypeptide #8.
 (from "bt_ags.pep")
 TOIG of: abg69074 check: 8975 from: 1 to: 413
 ID ABG69074 standard; protein; 413 AA.
 XX AC ABG69074;
 XX DT 07-OCT-2002 (first entry)
 XX DE Botulinum neurotoxin light chain polypeptide #8.
 XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW XX spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW XX bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW XX cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW XX lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW XX immunostimulant; antibacterial.
 XX OS Clostridium botulinum.
 XX PN WO200236758-A2.
 XX PD 10-MAY-2002.
 XX PF 06-NOV-2001; 2001WO-US047230.
 XX PR 06-NOV-2000; 2000US-0246774P.
 XX PR 20-JUL-2001; 2001US-00910186.
 XX PR 09-AUG-2001; 2001US-0311966P.
 XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX PI Smith LA, Jensen M;
 XX WPI; 2002-575192/61.
 XX N-PSDB; ABK98544.
 XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX Disclosure; Page 130-131; 166pp; English.
 CC The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70%. The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff

CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein

XX Sequence 413 AA;

ABG69074 Length: 413 August 31, 2004 14:39 Type: P Check: 8975 ..
 Found using 'seq23' (hayes346.key)

...

6 LCIKNNWDLFFPSSEDNFTDLNKGBEITSDTNIEAAENISLDLIQQYYLTTFDNFNEP
 56 59

66 ENISINLSSDIIGLELMPNIEFPNGKYELDKYTMFHYLRAQEFHKGSRIALTNSV
 101 106

126 NEALNPSRVYTFSSDYKVKYNKATEAAMFLGWVEQLVYDFDTSEVSTTDKIADITI
 136

186 IIPY

...

213 GAVILLETFEIPAIPVLGTFALSVYANKVLTVQTIDNALSRRNEKWDVYKVIYTNWLA
 263

273 KVTQIDLRKKMKALENQAEATKAIINYQNYTEEEKNNINENNIDLLSKNESINK
 304

333 AMININKFLNQCVSYLMSMIPYGVKRLDFDASLKDALLKYIRDNYGTLLIGQVDRLEMD
 380

393 KVNNTLSTDIPQLSKYVDNQ

 19 matches found in sequence:
 abg69075 ; Botulinum neurotoxin light chain polypeptide #9a.
 (from "bt.ags.pep")
 TOIG of: abg69075 check: 9369 from: 1 to: 861

ID ABG69075 standard; protein; 861 AA.

XX AC ABG69075;

XX DT 07-OCT-2002 (first entry)

XX DE Botulinum neurotoxin light chain polypeptide #9a.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

XX OS Clostridium botulinum.

XX PN WO200236758-A2.

XX PD 10-MAY-2002.

XX PF 06-NOV-2001; 2001WO-US047230.

XX PR 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Jensen M;

WPI; 2002-575192/61.

N-PSDB; ABK98545.

Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 serotype A, useful for producing the neurotoxin for vaccination against
 botulism, comprises sequence expressible in host other than Clostridium.

Claim 13; Page 133-134; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum
 neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 that is expressible in a host organism other than Clostridium, or has a
 total A+T content that is less than about 70%. The BoNT LC protein is
 useful in vaccination against botulism, for eliciting protective immunity
 in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 conditions characterised by hyperactivity of the lower motor neuron, and
 to control autonomic nerve function or tiptoe-walking due to stiff
 muscles common in children with cerebral palsy. The sequences are also
 useful for screening for botulinum neurotoxin inhibitors. This sequence
 represents a botulinum neurotoxin light chain serotype A protein

SQ Sequence 861 AA;

ABG69075 Length: 861 August 31, 2004 14:39 Type: P Check: 9369 ..
 Found using 'seq23' (hayes346.key)

1 MVQFVNKQFNKDPVNGVDIAIKIPNVGMQPVKAFKIHKNKIWIPIERDTFTNPEGDL
 22 25

61 NPPPEAKQVPVSYD

...

136 INVIQDGSYRSEELNLVIIGPSADIIQPECKSFGEVLNLTFRNGYGSTQYTRFSPDFTF
 186

196 GFESLEVDNTNPLLGAGKEATDPAVTLAHELHAGHRLYGLAIPNPNRVKNTNAYEMS
 234 251

256 GLEVSFEELRTFGHDAKFIDSLQENEPRLYYVYKFKDIASTLNKAKSIVGTASLQYMK
 286 288

316 NVPKEKLLSEDTSGKFSVDKLFKFKMLTEIYTEDNFVFKFKVLNRYTLNFDKAVF
 343 367

376 KINIVPKVNTYIYDGFNLRNTNLAANFNQNTENNNTNFTKLNKFTGLFEFFKLCVGRGI
 385 388 427

436 ITSKTKSLDKGNKALNDLCIKVNNWDLFFSPEDNFTNDLNKGEIITSDTIEAAENI
 447

496 SLDLIQOYVLTFFNEDNEPENISLENSSDIIGQLMLPNTERFPNGKKYELDKYTMFHYL
 504 549 554


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556  RAQEFHGKSRIALTNSVNEALINPVRVTFSSDYVKKVNKATEAAMFLGWVQLVYDF
      557
616  TDETSEVSTTDKIADITIIIPY
      ...
661  GAVILLEFIPIAIPVLGTFALVSYIANKVLTVQIDNALSRNEKWEDEVKIYIVTNWLA
      711
721  KVTQTIDLIRKMKREALENOAEATKAIINQYQNVQTEBEKKNINFINIDLLSKLINESINK
      752
781  AMININKELNQCYSVLYMNSMIPYGVKRELEDFASLKDALLKYIRDNYGTGLIGQVDRLEKD
      828
841  KVNNTLSTDIPIFQLSKYVDNQ
      -----
      7 matches found in sequence:
      abg69076 ; Botulinum neurotoxin light chain polypeptide #10.
      (from "bt_ags.pep")
      TOIG of: abg69076 check: 9222 from: 1 to: 441

      ID ABG69076 standard; protein; 441 AA.
      XX
      AC ABG69076;
      XX
      DT 07-OCT-2002 (first entry)
      XX
      DE Botulinum neurotoxin light chain polypeptide #10.
      XX
      DE Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
      KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
      KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
      KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
      KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
      KW immunostimulant; antibacterial.
      XX
      OS Clostridium botulinum.
      XX
      PN WO200236758-A2.
      XX
      PD 10-MAY-2002.
      XX
      PF 06-NOV-2001; 2001WO-US047230.
      XX
      PR 06-NOV-2000; 2000US-0246774P.
      XX
      PR 20-JUL-2001; 2001US-00910186.
      XX
      PR 09-AUG-2001; 2001US-0311966P.
      XX
      PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
      XX
      PI Smith LA, Jensen M;
      XX
      DR WPI; 2002-575192/61.
      XX
      DR N-FSD8; ABK98546.
      XX
      PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
      PT serotype A, useful for producing the neurotoxin for vaccination against
      PT botulism, comprises sequence expressible in host other than Clostridium.
      XX
      PS Claim 33; Page 135-136; 166pp; English.
      XX
      CC The invention relates to a nucleic acid molecule encoding a botulinum
      CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
      CC that is expressible in a host organism other than Clostridium, or has a
      CC total A+T content that is less than about 70% The BoNT LC protein is
      CC useful in vaccination against botulism, for eliciting protective immunity

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CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX
SQ Sequence 441 AA;

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ABG69076 Length: 441 August 31, 2004 14:39 Type: P Check: 9222
Found using 'seq23' (hayes346.key)

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1  MPTVINNFYNDPIDNNNIIMMEPPFARGTRYKAFKITDRIMWIPIERTYFGYKPEDFN
      33 36
      34 37
61  KSSGIFNRDVCYYDEYDYLNTNDKKNI
      ...
149 ERKKGIFANLIIFGPGVNLNENETIDIGIQNHPASREGFGIMQKTCPEYVSFNNVQE
      199
209 NKGASIFNRRGYFSDPALIIMHLELHVHLGLYGIKVDDLPIVPNEKKFFMQSTDAIQAE
      328
269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVDLNKLVLVCISDPNININIKKFKDKY
      289
      331
329 KFVEDSEKYSIDVESPDKLYKSLMFGFTETNAENYKIKTRASYFSDSLPPVKIKNLLD
      349
389 NEIYTIIEGFNISDKDMEKRYRGONKAINKQAYEEISKEHLAVYKIQMCKSVK
      421

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12 matches found in sequence:
abg69077 ; Botulinum neurotoxin light chain polypeptide #11.
(from "bt_ags.pep")
TOIG of: abg69077 check: 9628 from: 1 to: 852

```

```

ID ABG69077 standard; protein; 852 AA.
XX
AC ABG69077;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #11.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
PN WO200236758-A2.
XX
PD 10-MAY-2002.
XX
PF 06-NOV-2001; 2001WO-US047230.
XX
PR 06-NOV-2000; 2000US-0246774P.
PR 20-JUL-2001; 2001US-00910186.

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Thu Sep 2 08:56:11 2004

PR 09-AUG-2001; 2001US-0311966P.
XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX Smith LA, Jensen M;
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98547.
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 52; Page 138-139; 166pp; English.
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 852 AA;
SQ
ABG69077 Length: 852 August 31, 2004 14:39 Type: P Check: 9628 ..
Found using 'seq23' (hayes346.key)

1 PVTINNFNVDIDNNIMPEPPARGTGRVYKAFKITDRIWIIPERYTFGYKPEDFNK
32 35
33 36
61 SSGIFNRDVEYDPIYDINTDKNI
...
148 ERKKGIFANLIIFPGPVLNENETIDIGIQNHFPASREGFGGIMQMKFCPEYVSVFNNVOR
198
208 NKGASIFNRGYSDFALILMHLELIHVLHGLYGIKVDLLPIVENEKKFFMQSTDAIQAE
268 LXTFGQDPSIITPSTDKSYIDKVLQNFGRGIVDRLNKVLVCISDPNININIKKFKDKY
288
328 KFVEDSEGKYSIDVESFDKLYKSLMFGFTETNAENYKIKTRASYFSDSLPPVKIKNLLD
330
388 NEITYTIEEGFNISKDEMEYRGQNKAINQAYEEISKEHLAVYKIOMCKSVKAPGICID
420
448 VDNEDLFFIADKNSFSDLSKNERIE
...
519 VYEKQPAIKKIFTDENTIFQYLSQTFPLDIRDISLTSFDDALLFSNKVYSFPMYIK
569
579 TANKVVEAGLFAGWVKQIVNDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
622

639 ENAFETAGASILLEFIPVVGAFLESYIDNKNKIITIDNALTNRKNSWDMYGL
696
699 IVAQWLSTVNTQFYTIKEGMYKALNYQAQALEELIKYRYNIYSEKESKNINIDFNDINSK
719
759 LNEGINQAINNINNFINGCSVYLMKKMPLA
...

9 matches found in sequence:
abg69078 ; Botulinum neurotoxin light chain polypeptide #12.
(from "bt_ags.pep")
TOIG of: abg69078 check: 5695 from: 1 to: 436
ID ABG69078 standard; protein; 436 AA.
XX AC ABG69078;
XX DT 07-OCT-2002 (first entry)
XX Botulinum neurotoxin light chain polypeptide #12.
XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98548.
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 33; Page 140-141; 166pp; English.
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70%. The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, cosmetic treatment of facial wrinkles,
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
CC represents a botulinum neurotoxin light chain serotype A protein
XX

SQ Sequence 436 AA;
 ABG69078 Length: 436 August 31, 2004 14:39 Type: P Check: 5695 ..
 Found using 'seq23' (hayes346.key)
 ...
 151 INPSVIITGPENIIDPETSFTKLTNNTFAAQEGFGALSIIISPRFMTYSNATNDVGE 201
 211 GRFSKSEFCMDPILIMHELMHAMHNLGYIAIPNDQTISSTVSNTIFYSQYNVKLEYAEIY 257
 271 AFGGPTIDLPKSARKYFEKALDYRSIAKRLNSITTANPSSFNKYIGEYKQKLIRYR 329
 331 FVVESSGSEVTNRNKFVELYNELTQITFEFNKAKIYNQNRKIYLSNVYTPVTANILDDN 379
 391 VYDIQNGFNIPKSNLNVLFMGQNLNRNPALRKVPENMLYLF 391
 ...

 17 matches found in sequence:
 abg69079 ; Botulinum neurotoxin light chain polypeptide #13.
 (from "bt_ags.pep")
 TOIG of: abg69079 check: 3927 from: 1 to: 811
 ID ABG69079 standard; protein; 811 AA.
 AC ABG69079;
 XX
 DT 07-OCT-2002 (first entry)
 DE Botulinum neurotoxin light chain polypeptide #13.
 XX
 KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.
 XX
 OS Clostridium botulinum.
 XX
 PN WO200236758-A2.
 XX
 PD 10-MAY-2002.
 XX
 PF 06-NOV-2001; 2001WO-US047230.
 XX
 PR 06-NOV-2000; 2000US-0246774P.
 PR 20-JUL-2001; 2001US-00910186.
 PR 09-AUG-2001; 2001US-0311966P.
 XX
 PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
 XX
 XX Smith LA, Jensen M;
 PI WPI; 2002-575192/61.
 DR N-PSDB; ABK98549.
 XX
 PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.
 XX
 PS Claim 52; Page 142-144; 166pp; English.
 XX

CC The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70% The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tip-toe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein
 XX
 SQ Sequence 811 AA;
 ABG69079 Length: 811 August 31, 2004 14:39 Type: P Check: 3927 ..
 Found using 'seq23' (hayes346.key)
 ...
 151 INPSVIITGPENIIDPETSFTKLTNNTFAAQEGFGALSIIISPRFMTYSNATNDVGE 201
 211 GRFSKSEFCMDPILIMHELMHAMHNLGYIAIPNDQTISSTVSNTIFYSQYNVKLEYAEIY 257
 271 AFGGPTIDLPKSARKYFEKALDYRSIAKRLNSITTANPSSFNKYIGEYKQKLIRYR 329
 331 FVVESSGSEVTNRNKFVELYNELTQITFEFNKAKIYNQNRKIYLSNVYTPVTANILDDN 379
 391 VYDIQNGFNIPKSNLNVLFMGQNLNRNPALRKVPENMLYLF 391
 ...
 458 IGLDSVDKTDIFLRKDINEETVIYYPDNVSDQVILSKNTSEHGQDLIYPSIDSESEI 508
 518 LPGAENVFYDNRNTQNVLYNSYYLSQKLSDNVEDFTFTRSTEEALDNSAKVYTPFTL 571
 578 ANKNAGVQGLFLMWANDVVEDFTTNILRKDTLDKISDVSAIPIYIGPALNISNSVRRG 669
 638 NTEFAFVGTGVTILLEAFPEFTIPALGAFVIYSKVQVERNEIITDNCLEQRKRWKDSY 697
 698 EWMNGTWLSRIITQFNNSIYQMYDSLNYQAGAKAKIDLEYKYSKSDKENIKSQVENLK 738
 758 NSLDVKISEAMNNINKFIRECSVTVLFKNMLPKV 738
 ...

 7 matches found in sequence:
 abg69080 ; Botulinum neurotoxin light chain polypeptide #14.
 (from "bt_ags.pep")
 TOIG of: abg69080 check: 7279 from: 1 to: 440
 ID ABG69080 standard; protein; 440 AA.
 XX

305 INKTIPTSSWISNIDKYPKIFSEKYNFDKNTGNEFVNIDKFNLSYSDLTNTVMSEVTVSSQ
320
365 YNKNRTHYFSRHLVPANILDDNIYTIIRDGNLTNKGFIENSGQNIERNPALQKLSS
378
425 ESVVDLF
...
16 matches found in sequence:
abg69081 ; Botulinum neurotoxin light chain polypeptide #15.
(from "bt_ags pep")
TOIG of: abg69081 check: 6240 from: 1 to: 824
ID ABG69081 standard; protein; 824 AA.
XX AC ABG69081;
XX AC ABG69081;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #15.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98551.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 52; Page 147-149; 166pp; English.
XX CC The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
that is expressible in a host organism other than Clostridium, or has a
total A-T content that is less than about 70% The BoNT LC protein is
useful in vaccination against botulism, for eliciting protective immunity
in a mammal, for treating dystonias, spasticity, pain, ocular motility,
facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
conditions characterised by hyperactivity of the lower motor neuron, and
to control autonomic nerve function or tiptoe-walking due to stiff
muscles common in children with cerebral palsy. The sequences are also
useful for screening for botulinum neurotoxin inhibitors. This sequence
represents a botulinum neurotoxin light chain serotype A protein
Sequence 824 AA;

AC ABG69080;
XX DT 07-OCT-2002 (first entry)
XX DE Botulinum neurotoxin light chain polypeptide #14.
XX KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX OS Clostridium botulinum.
XX PN WO200236758-A2.
XX PD 10-MAY-2002.
XX PF 06-NOV-2001; 2001WO-US047230.
XX PR 06-NOV-2000; 2000US-0246774P.
XX PR 20-JUL-2001; 2001US-00910186.
XX PR 09-AUG-2001; 2001US-0311966P.
XX PA (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX PI Smith LA, Jensen M;
XX DR WPI; 2002-575192/61.
XX DR N-PSDB; ABK98550.
XX PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
botulism, comprises sequence expressible in host other than Clostridium.
XX PS Claim 33; Page 145-146; 166pp; English.
XX CC The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
that is expressible in a host organism other than Clostridium, or has a
total A-T content that is less than about 70% The BoNT LC protein is
useful in vaccination against botulism, for eliciting protective immunity
in a mammal, for treating dystonias, spasticity, pain, ocular motility,
facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
conditions characterised by hyperactivity of the lower motor neuron, and
to control autonomic nerve function or tiptoe-walking due to stiff
muscles common in children with cerebral palsy. The sequences are also
useful for screening for botulinum neurotoxin inhibitors. This sequence
represents a botulinum neurotoxin light chain serotype A protein
Sequence 440 AA;
ABG69080 Length: 440 August 31, 2004 14:39 Type: P Check: 7279 ..
Found using 'seq23' (hayes346.key)
1 TWPVKDFNYSDPVNDILYRIPQNKLTTPVKAFMITQNTWIPRFSNDNPSLSKP
20 23
61 PRPTSKYQSDPSYLSDEQKOTFLKGIIKLFKRINERDICKLNLVGVSPFMGDS
67 70
121 TPEDTFDTRHTTNIAVEKPFENGSKVNTIITPSVLIFGL
67 70
...
245 DKRIRPQVSEGFSDQGNVQFEBLYTFGGDLVEIIQIERSQLREKALGHYKDIAKLNN
295

ABG69081 Length: 824 August 31, 2004 14:39 Type: P Check: 6240
Found using 'seq23' (hayes346.key)

```
1 TWVVKDFNSDPVNDNDILYLRIPQNKLIITPVKAFMITQNTWIPERFSDTNPSLSKP
  20 23
61 PRPTSKQSYDPSVLSLTDQKDTFLKGLIKLFRINERDICKLINYLIVGSPFMGDSS
  67 70
121 TPEDTFDFTRHTTIAVEKPFENGSKVNTNIITPSVLIFGPL
...
245 DKRIRPQVSEFFSQDGNVQFEELYTFGLDVEITQIERSQLREKALGHVKDIKRLNN
  295
305 INKTIPSSWISNIDKPKIFSEKYNFDKNTGNFVNIDKFNLSYSDLTNTVMSEVVYSSQ
  320
365 YNVKNRTHYSRHYLPVFANILDDNIYITRDGPNLTNKGFNISGQNIERNPALQLKSS
  378
425 ESVVDLF
...
478 ETNVQVNSDKFSLDESILDGQVPINPVLPLLENVNMVNEPLNPGEEIVFYDDITKYVDY
  528 534
538 LNSYVILESKLSNNVENITLTSVEALGYSNKIYTFPLSLAEKVNKGVQAGLFLNWN
  541
598 EVVEDFTNMKKDITDKISDVSVIPIYIGPALNIGNSALRGNFNQAFATAGVAFLLLEGF
  573
658 PEFTIPALGVFTFYSSIQEREKIITKTIENCLQORVKRWKDSYQMMVSNLRLITQFNHI
  671
718 NYQVDSLSYQADAIKAKIDLEYKYSQSGDKENIKSQVENLKNLSLDVKISEAMNNIKFI
  719
778 RECSVLYLFKNMLPKV
  722
```

6 matches found in sequence:

abg69082; Botulinum neurotoxin light chain polypeptide #16.

(from "Bt_Ags.pep")

TOIG of: abg69082 check: 4295 from: 1 to: 427

ID ABG69082 standard; protein; 427 AA.

XX AC
XX AC
XX AC

DT 07-OCT-2002 (first entry)

DE Botulinum neurotoxin light chain polypeptide #16.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;

cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
lower motor neuron hyperactivity; autonomic nerve function; muscular;
immunostimulant; antibacterial.

Clostridium botulinum.

WO200236758-A2.

10-MAY-2002.

06-NOV-2001; 2001WO-US047230.

06-NOV-2000; 2000US-0246774P.

20-JUL-2001; 2001US-00910186.

09-AUG-2001; 2001US-0311966P.

(USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

Smith LA, Jensen M;

WPI; 2002-575192/61.

N-PSDB; ABK98552.

Novel nucleic acid molecule encoding botulinum neurotoxin light chain
serotype A, useful for producing the neurotoxin for vaccination against
botulism, comprises sequence expressible in host other than Clostridium.

Claim 33; Page 150-151; 166pp; English.

The invention relates to a nucleic acid molecule encoding a botulinum
neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
that is expressible in a host organism other than Clostridium, or has a
total A+T content that is less than about 70%. The BoNT LC protein is
useful in vaccination against botulism, for eliciting protective immunity
in a mammal, for treating dystonias, spasticity, pain, ocular motility,
facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
conditions characterised by hyperactivity of the lower motor neuron, and
to control autonomic nerve function or tiptoe-walking due to stiff
muscles common in children with cerebral palsy. The sequences are also
useful for screening for botulinum neurotoxin inhibitors. This sequence
represents a botulinum neurotoxin light chain serotype A protein

Sequence 427 AA;

ABG69082 Length: 427 August 31, 2004 14:39 Type: P Check: 4295
Found using 'seq23' (hayes346.key)

```
1 MPKINSFNYPNDPVNDRITILYKFGGQEFYKSFNIMKNIWIIPERNVIGTTPQDFHPPTS
  30 33
61 LKNGDSSYYDPNVLQSDDEKDRF
...
222 YGAKGITTKVTITQKONPLITNIRGTNIEEFLTFGGTDLNLTSAQSNDIYTNLLADYKK
  272 279
282 IASKLSKVQVSNPLNPNPKDVFPEAKYGLDKDASGIYSVNVINKNFNDFKKLYSFTEFDLAT
  282 299
342 KFOVKCRQTYIGQYKFKLSNLLNDSIYNISEGYNNLNKVNFRQGNANLNPRITPTIG
  355 357
402 RGLVKKIIR
...
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12 matches found in sequence:
abg69083 ; Botulinum neurotoxin light chain polypeptide #17.
(from "bt_ags.pep")
TOIG of: abg69083 check: 4621 from: 1 to: 804

ID ABG69083 standard; protein; 804 AA.
XX
AC ABG69083;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #17.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
XX WO200236758-A2.
XX
XX 10-MAY-2002.
XX
XX 06-NOV-2001; 2001WO-US047230.
XX
XX 06-NOV-2000; 2000US-0246774P.
XX
XX 20-JUL-2001; 2001US-00910186.
XX
XX 09-AUG-2001; 2001US-0311966P.
XX
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Jensen M;
XX
XX WPI; 2002-575192/61.
XX
XX N-PSDB; ABK98553.
XX
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
XX serotype A, useful for producing the neurotoxin for vaccination against
XX botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 52; Page 152-154; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX that is expressible in a host organism other than Clostridium, or has a
XX total A+T content that is less than about 70% The BoNT LC protein is
XX useful in vaccination against botulism, for eliciting protective immunity
XX in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX conditions characterised by hyperactivity of the lower motor neuron, and
XX to control autonomic nerve function or tiptoe-walking due to stiff
XX muscles common in children with cerebral palsy. The sequences are also
XX useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 804 AA;
SQ

ABG69083 Length: 804 August 31, 2004 14:39 Type: P Check: 4621 ..
Found using 'seq23' (hayes346.key)

1 MPKINSFNYPNDPNDRIILYKPGCCQCFYKSFNIMKNIWIIPERNVIGTTPQDFHPPTS
30 33
61 LKNGDSSYDPNLYLQSDDEKDRF
...
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```
222 YGAKGITTKVTITOKQNPLITNIRGTNIEBFLTFGGTDLNIIITSAQSNDIYTNLLADYKK
272 279
282 IASKLSKVQVSNPLNPNYKDVFEAKYGLDKDASGIYSVINKNFNDFEKLKYSFTEFDLAT
282 299
342 KFQVKCRQTYIGQYKFKLSNLDNSIYNISEGYNNLNKYNFRQANLNPRITITPTG
355 357
402 RGLVKKIIR
...
472 ILNFNSAPGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVHNLNFFYLDIAQKVPEG
522 522
532 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKPQQAALFVSWIQQVLVDFTTEANQKS
552
592 TVDKIADISIVVPYIGLALNIGNEAQNKGFKDALELLGAGILLEFEPELLIPTILVFTIK
605
652 SFLGSSDNKNKVIKAINNALKERDEKWEVYSFIVSNMWTKINTOFNKKKQMYQALQNO
682 705
712 VNAIKTIIESKNSYTLBEKNELTNKYDIKQIENELNKNQVSIAMNNIDRFLETSSISYLM
723
772 KLINE
...
-----
9 matches found in sequence:
abg69084 ; Botulinum neurotoxin light chain polypeptide #18.
(from "bt_ags.pep")
TOIG of: abg69084 check: 1754 from: 1 to: 443

ID ABG69084 standard; protein; 443 AA.
XX
AC ABG69084;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #18.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
XX Clostridium botulinum.
XX
XX WO200236758-A2.
XX
XX 10-MAY-2002.
XX
XX 06-NOV-2001; 2001WO-US047230.
XX
XX 06-NOV-2000; 2000US-0246774P.
XX
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PR 20-JUL-2001; 2001US-00910186.
PR 09-AUG-2001; 2001US-0311966P.
XX
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Jensen M;
XX
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98554.
XX
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 33; Page 155-156; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
CC that is expressible in a host organism other than Clostridium, or has a
CC total A+T content that is less than about 70% The BoNT LC protein is
CC useful in vaccination against botulism, for eliciting protective immunity
CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
CC conditions characterised by hyperactivity of the lower motor neuron, and
CC to control autonomic nerve function or tiptoe-walking due to stiff
CC muscles common in children with cerebral palsy. The sequences are also
CC useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 443 AA;
XX
ABG69084 Length: 443 August 31, 2004 14:39 Type: P Check: 1754 ..
Found using 'seq23' (hayes346.key)
1 MPVVSFNYPNDPVNDTILYMQIPYEKSKYKAFEMRNWIIIPERNITIGTDPDSDFD
21 24 33 36 34 37
61 PPASLENGSSAYYDPNLTDAEKDRY
...
237 YGARGVYKETIKVKQAPLMAEKPIRLEEFITFGQDINIITSAMKEKIYNLLANYEK
287 294
297 IATRLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGSGYTVNENKFNKLYSFTFIDL
316 319 372
357 ANKFVKCRNTYFIKYGFLKVPNLLDDIYTVSGEFGNIGLAVNNGQIKLPKIIDSI
372
417 PDKGLVEKI
...
15 matches found in sequence:
abg69085; Botulinum neurotoxin light chain polypeptide #19.
(from "bt_ags.pep")
TOIG of: abg69085 check: 3301 from: 1 to: 858
ID ABG69085 standard; protein; 858 AA.
XX
AC ABG69085;
XX

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DT 07-OCT-2002 (first entry)
XX
XX Botulinum neurotoxin light chain polypeptide #19.
XX
XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
XX spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
XX bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
XX cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
XX lower motor neuron hyperactivity; autonomic nerve function; muscular;
XX immunostimulant; antibacterial.
XX
XX Clostridium botulinum.
XX
XX WO200236758-A2.
XX
XX 10-MAY-2002.
XX
XX 06-NOV-2001; 2001WO-US047230.
XX
XX 06-NOV-2000; 2000US-0246774P.
XX 20-JUL-2001; 2001US-00910186.
XX 09-AUG-2001; 2001US-0311966P.
XX (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
XX Smith LA, Jensen M;
XX
XX WPI; 2002-575192/61.
XX N-PSDB; ABK98555.
XX
XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
XX serotype A, useful for producing the neurotoxin for vaccination against
XX botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 52; Page 157-159; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX that is expressible in a host organism other than Clostridium, or has a
XX total A+T content that is less than about 70% The BoNT LC protein is
XX useful in vaccination against botulism, for eliciting protective immunity
XX in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX conditions characterised by hyperactivity of the lower motor neuron, and
XX to control autonomic nerve function or tiptoe-walking due to stiff
XX muscles common in children with cerebral palsy. The sequences are also
XX useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 858 AA;
XX
ABG69085 Length: 858 August 31, 2004 14:39 Type: P Check: 3301 ..
Found using 'seq23' (hayes346.key)
1 MPVVSFNYPNDPVNDTILYMQIPYEKSKYKAFEMRNWIIIPERNITIGTDPDSDFD
21 24 33 36 34 37
61 PPASLENGSSAYYDPNLTDAEKDRY
...
237 YGARGVYKETIKVKQAPLMAEKPIRLEEFITFGQDINIITSAMKEKIYNLLANYEK
287 294
297 IATRLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGSGYTVNENKFNKLYSFTFIDL
316 319 372
357 ANKFVKCRNTYFIKYGFLKVPNLLDDIYTVSGEFGNIGLAVNNGQIKLPKIIDSI
372
417 PDKGLVEKI
...
15 matches found in sequence:
abg69085; Botulinum neurotoxin light chain polypeptide #19.
(from "bt_ags.pep")
TOIG of: abg69085 check: 3301 from: 1 to: 858
ID ABG69085 standard; protein; 858 AA.
XX
AC ABG69085;
XX

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Thu Sep 2 08:56:11 2004

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357 ANKFYKCRNTYFKYGLFVLPNLLDDDIYTVSGFNIGNLAVNNRGQNIKLNPKIIDS1
372
417 PDKGLVEKI
...
493 NNVERNLDVILNYSQTIPQISNRTLTNLVQDNSYVPRYDSNGTSEIEEYDVVDENVFF
543
553 YLHAQYPEGETNLSLTSSIDTALLEESKDIFFSSEFIDTINKFPVNAALFIDWISKVIRD
553
613 FTTBATQKSTVDKIADISLIVPYVGLALNIIIEAEKGNFEAFELLGVGILLEFPVELTI
635
673 PVILVFTIKSYIDSYENKKAINKAINNSLIERAKWKELYSIVGNSWLTRINTQFNKKE
712
733 QMYQALQNVDAIKTAIEYKKNYNTSDEKNRLESBYNNINIEELNKKVSLAMKNIERFM
753
793 TESSISYLMKLINE
...
-----
10 matches found in sequence:
abg69086 ; Botulinum neurotoxin light chain polypeptide #20.
(from "bt_ags.pep")
TOIG of: abg69086 check: 3610 from: 1 to: 444

ID ABG69086 standard; protein; 444 AA.
XX
AC ABG69086;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #20.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
KW immunostimulant; antibacterial.
XX
OS Clostridium botulinum.
XX
PN WO200236758-A2.
XX
PD 10-MAY-2002.
XX
PF 06-NOV-2001; 2001WO-US047230.
XX
PR 06-NOV-2000; 2000US-0246774P.
PR 20-JUL-2001; 2001US-00910186.
PR 09-AUG-2001; 2001US-0311966P.
XX
PA (USSA ) US ARMY MEDICAL RES & MATERIAL COMMAND.
XX
PI Smith LA, Jensen M;
XX
DR WPI; 2002-575192/61.
DR N-PSDB; ABK98556.

XX
PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
PS Claim 33; Page 160-161; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX that is expressible in a host organism other than Clostridium, or has a
XX total A+T content that is less than about 70% The BoNT LC protein is
XX useful in vaccination against botulism, for eliciting protective immunity
XX in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX conditions characterised by hyperactivity of the lower motor neuron, and
XX to control autonomic nerve function or tip-toe-walking due to stiff
XX muscles common in children with cerebral palsy. The sequences are also
XX useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
SQ Sequence 444 AA;
ABG69086 Length: 444 August 31, 2004 14:39 Type: P Check: 3610 ..
Found using 'seq23' (hayes346.key)
1 MPVNITKNFYNDPINNDDIIMWEPNDPGPGTYKAFRIIDRIWIVPERFTYGFQPDQFN
33 36
34 37
61 ASTGVFSKDVYEDPTYLKTDKDAEKDKFLKTMKLFNLRINSKPSGQRLDMIVDAIPYLG
71 74
121 NAST
...
239 LYGIKISNLPITPNTKEFFFMQHSDFVQAEELYTFGGHDPVSISPSTDMNLYKALQNFQD
289
299 IANRLNIVSSAQSAGSIDISLYKQIYKKNYDFVEDPDKNGKYSVDKDKLYKALMFGFTET
319 327
359 NLAGYGIKTRYSYFSSEYLPPIKTEKLLDNTIYTQNEGFNIASKNLKTFFGQNKAVNKE
370
419 AYBEISLEHLVYIRIAMCKPVMYXXD
420 431
-----
15 matches found in sequence:
abg69087 ; Botulinum neurotoxin light chain polypeptide #21.
(from "bt_ags.pep")
TOIG of: abg69087 check: 3952 from: 1 to: 848

ID ABG69087 standard; protein; 848 AA.
XX
AC ABG69087;
XX
DT 07-OCT-2002 (first entry)
XX
DE Botulinum neurotoxin light chain polypeptide #21.
XX
KW Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
```


KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

OS Clostridium botulinum.

PN WO200236758-A2.

XX 10-MAY-2002.

XX 06-NOV-2001; 2001WO-US047230.

XX 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

PI Smith LA, Jensen M;

XX WPI; 2002-575192/61.

DR N-PSDB; ABK98557.

XX Novel nucleic acid molecule encoding botulinum neurotoxin light chain
 PT serotype A, useful for producing the neurotoxin for vaccination against
 PT botulism, comprises sequence expressible in host other than Clostridium.

XX Claim 52; Page 162-164; 166pp; English.

PS The invention relates to a nucleic acid molecule encoding a botulinum
 CC neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
 CC that is expressible in a host organism other than Clostridium, or has a
 CC total A+T content that is less than about 70%. The BoNT LC protein is
 CC useful in vaccination against botulism, for eliciting protective immunity
 CC in a mammal, for treating dystonias, spasticity, pain, ocular motility,
 CC facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
 CC myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
 CC conditions characterised by hyperactivity of the lower motor neuron, and
 CC to control autonomic nerve function or tiptoe-walking due to stiff
 CC muscles common in children with cerebral palsy. The sequences are also
 CC useful for screening for botulinum neurotoxin inhibitors. This sequence
 CC represents a botulinum neurotoxin light chain serotype A protein

SQ Sequence 848 AA;

ABG69087 Length: 848 August 31, 2004 14:39 Type: P Check: 3952 ..
 Found using 'seq23' (hayes346.key)

1 MFVNINKFNNDPINDDIIMPEFNDPGGTYYKAFRIIDRIWIYPERFTYGFQPDQFN
 33 36
 34 37

61 ASTGVFSKDVYEDFTYLTDAEKDKFLKTMKLFNRINSKPSGQRLDMIVDAIPYLG
 71 74

121 NAST

...

239 LYGIKISNLPITPNTKEFFMOHSDPVQAEELYTFGHDPSVISPSPTDMNIYNKALQNFOF
 289

299 IANRLNIVSSAQSGLIDISLYKQIYKNKYDFVEDPNGKYSVDKDFKLYKXLMFGFTET
 319 327
 348

359 NLAEGYGIKRYSYFSEYLPPIKTEKLLDNTIYTQNEFNITASKNKLKTEFNQNKAVNKE
 370

419 AVEEISLEHLVIRIAMCKPVMYKNTGKSEQCIIVNNEDLPFIANKDSFSKDLAKAETIA
 420 431

479 YNTQNN

...

495 LILDNLSSGIDLPENTPEFTNFDDIDIPVIKQSAALKKIFVDGDSLFYFIHQTFPSN
 545

555 IENQLTNSLNDALRNNKVVYTFSTNLVLEKANTVVGASLFVNVWVGVIDDFTSSTQKST
 574

615 IDKVSDVSIIPY

...

651 GAAILMEFIFELIPIVIGFTILSYGNKGHIIMTISNALKKRQKQWDMYGLIVSQWLS
 701

711 TVNTQFYTIKERYMNALNNQSALEKIIEDQYNYRSEEDKMNINIDENDIDFKLNQSNIL
 742

771 AINNIDFINQCSISYLMNRMIPLA

...

10 matches found in sequence:
 abg69089; Botulinum neurotoxin light chain polypeptide #9b.
 (from "bc_ags.pep")
 TOIG of: abg69089 check: 8712 from: 1 to: 449

ID ABG69089 standard; protein; 449 AA.

AC ABG69089;

DT 07-OCT-2002 (first entry)

DE Botulinum neurotoxin light chain polypeptide #9b.

XX Botulinum neurotoxin light chain; BoNT LC; botulism; dystonia; pain;
 KW spasticity; ocular motility; facial dyskinesia; stiff-person syndrome;
 KW bladder dysfunction; segmental myoclonus; hyperkinetic disorder;
 KW cosmetic treatment; facial wrinkle; cerebral palsy; analgesic; relaxant;
 KW lower motor neuron hyperactivity; autonomic nerve function; muscular;
 KW immunostimulant; antibacterial.

XX Clostridium botulinum.

XX WO200236758-A2.

XX 10-MAY-2002.

XX 06-NOV-2001; 2001WO-US047230.

XX 06-NOV-2000; 2000US-0246774P.

PR 20-JUL-2001; 2001US-00910186.

PR 09-AUG-2001; 2001US-0311966P.

XX (USSA) US ARMY MEDICAL RES & MATERIAL COMMAND.

XX Smith LA, Jensen M;

XX WPI; 2002-575192/61.

DR N-PSDB; ABK98545.

XX

Thu Sep 2 08:56:11 2004

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PT Novel nucleic acid molecule encoding botulinum neurotoxin light chain
PT serotype A, useful for producing the neurotoxin for vaccination against
PT botulism, comprises sequence expressible in host other than Clostridium.
XX
XX Claim 13; Page 165-166; 166pp; English.
XX
XX The invention relates to a nucleic acid molecule encoding a botulinum
XX neurotoxin light chain (BoNT LC) serotype A, where the DNA has a sequence
XX that is expressible in a host organism other than Clostridium, or has a
XX total A+T content that is less than about 70% The BoNT LC protein is
XX useful in vaccination against botulism, for eliciting protective immunity
XX in a mammal, for treating dystonias, spasticity, pain, ocular motility,
XX facial dyskinesias, stiff-person syndrome, bladder dysfunction, segmental
XX myoclonus, hyperkinetic disorders, cosmetic treatment of facial wrinkles,
XX conditions characterised by hyperactivity of the lower motor neuron, and
XX to control autonomic nerve function or tip-toe-walking due to stiff
XX muscles common in children with cerebral palsy. The sequences are also
XX useful for screening for botulinum neurotoxin inhibitors. This sequence
XX represents a botulinum neurotoxin light chain serotype A protein
XX
XX Sequence 449 AA;
XX
ABG69089 Length: 449 August 31, 2004 14:39 Type: P Check: 8712 ..
Found using 'seq23' (hayes346.key)
1 MVQFVNKQFNKDPVNGVDIAYIKIPNVGQMPQVPKAFKHINKIWIPIERDTFTNPEEGDL
22 25
61 NPPPEAKQVPVSYD
...
136 INVIOPGSYRSEELNVIIGPSADIIQPECKSFGEVNLNTRNGYQSTYIRFSPDFTF
186
196 GFESLEVDTNELLGAGKFPATDPAVTLAELIHAGHRLYGIAINENRVPKVTNAYEYS
234
256 GLEVSFEELRTGGHDAKFDLSLOENEFRLYNNKFKDIASITLNKAKSIVGTTSIQYMK
288
316 NVFKEKYLSEDTSGRKFSVDKLFKDKLXKMLTEIYTDNFDNVKFFKVLNKRKTLNFDKAVF
343
376 KINIVPKVNTIYDGFNLRNLNLAANFNGQNTIEINNMFNFKLNKFTGLFEFFYKLLCVRG
385 388
436 ITSKTSKSLDKGYNK
-----
2 matches found in sequence:
abu56836 ; BoNT/A Hc binding antibody scTv VH region from 1A1 #1.
(from "bt_ags.pep")
TOIG of: abu56836 check: 2293 from: 1 to: 66
ID ABU56836 standard; protein; 66 AA.
XX
XX AC ABU56836;
XX
XX 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VH region from 1A1 #1.
XX
XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW

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immunoglobulin.
Mus sp.
US2002155114-A1.
24-OCT-2002.
31-AUG-1998; 98US-00144886.
31-AUG-1998; 98US-00144886.
(MARK/) MARKS J D.
(AMER/) AMERSDORFER P.
Marks JD, Amersdorfer P;
WPI; 2003-182618/18.
Novel antibody that specifically binds and neutralizes botulinum
neurotoxin type A useful for neutralizing botulinum neurotoxin and
treating botulism.
Claim 6; Page 22; 31pp; English.
The invention relates to an isolated antibody that specifically binds to
an epitope specifically bound by an antibody expressed by a clone such as
clone S25, C25, C39, 1C6 and clone 1P3, where the antibody binds to and
neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
polypeptide comprising BoNT/A neutralising epitope comprising an epitope
which is specifically bound by the antibody, where the polypeptide is not
a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
antibody that neutralises BoNT/A (by contacting several antibodies with
an epitope specifically bound by an antibody expressed by any of the
novel clones and isolating an antibody that specifically binds to the
epitope). The antibody is useful for neutralising a BoNT/A, by contacting
botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
chain variable region complementarity determining region) and with a
second anti-BoNT/A antibody which comprises a VH CDR, where the second
antibody binds to a different epitope than the first anti-BoNT/A
antibody. The antibody is useful in the treatment of pathologies
associated with botulinum neurotoxin poisoning, for rapid
detection/diagnosis of botulism and in the detection and/or
quantification of BoNT/A in a biological sample obtained from an organism
which is indicative of a Clostridium botulinum infection of the organism.
The present sequence is a heavy chain variable region (VH) of a single
chain antibody (scFv) of the invention
XX
XX Sequence 66 AA;
ABU56836 Length: 66 August 31, 2004 14:39 Type: P Check: 2293 ..
Found using 'seq23' (hayes346.key)
1 EVKLVEGGGLVQPGSRKLSKATSGTFTSDYMSWIROSPDKRLEWWTISDGGTYTYV
33 36
61 PDSVKG
-----
1 match found in sequence:
abu56841 ; BoNT/A Hc binding antibody scTv VL region from 1B3 #1.
(from "bt_ags.pep")
TOIG of: abu56841 check: 113 from: 1 to: 57
ID ABU56841 standard; protein; 57 AA.
XX
XX AC ABU56841;
XX
XX 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VL region from 1B3 #1.
XX
XX DE
XX

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Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VL; immunoglobulin.

Mus sp.

US2002155114-A1.

24-OCT-2002.

31-AUG-1998; 98US-00144886.

31-AUG-1998; 98US-00144886.

(MARK/) MARKS J D.

(AMER/) AMERSDORFER P.

Marks JD, Amersdorfer P;

WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H₂c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;

ABU56841 Length: 57 August 31, 2004 14:39 Type: P Check: 113
Found using 'seq23' (hayes346.key)

1 DSELTQPTTAASPGKITTCCASSSSISNNLHWYQRPQGFSPKLLIYRTSNLAS
33 36

1 match found in sequence:

abu56842 ; BoNT/A Hc binding antibody scTv VL region from 1F3 #1.
(from "bt ags.pep")
TOIG of: abu56842 check: 9986 from: 1 to: 57

ID ABU56842 standard; protein; 57 AA.

XX AC ABU56842;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 1F3 #1.

KW

KW

XX

OS

XX

PN

XX

PD

XX

PF

XX

PR

XX

PA

XX

PI

XX

DR

XX

PT

XX

PT

XX

PS

XX

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

CC

Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VL; immunoglobulin.

Mus sp.

US2002155114-A1.

24-OCT-2002.

31-AUG-1998; 98US-00144886.

31-AUG-1998; 98US-00144886.

(MARK/) MARKS J D.

(AMER/) AMERSDORFER P.

Marks JD, Amersdorfer P;

WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H₂c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;

ABU56842 Length: 57 August 31, 2004 14:39 Type: P Check: 9986
Found using 'seq23' (hayes346.key)

1 DIELTQSPASMSASPGKVTMTCTATSSVSSYLHWYQRPQGFSPKLLIYRTSNLAS
33 36

4 matches found in sequence:

abu56843 ; BoNT/A Hc binding antibody scTv VH region from C15 #2.
(from "bt ags.pep")
TOIG of: abu56843 check: 9807 from: 1 to: 59

ID ABU56843 standard; protein; 59 AA.

XX AC ABU56843;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from C15 #2.

Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VH; immunoglobulin.

Mus sp.
US2002155114-A1.
24-OCT-2002.
31-AUG-1998; 98US-00144886.
31-AUG-1998; 98US-00144886.
(MARK/) MARKS J D.
(AMER/) AMERSDORFER P.
Marks JD, Amersdorfer P;
WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 22; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C35, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 59 AA;
ABU56843 Length: 59 August 31, 2004 14:39 Type: P Check: 9807 ..
Found using 'seq23' (hayes346.key)

1 MATLTVDKSSSTAYMQLSSPTSDSAVYICARGIYDYGNYANDYWGQGTIVTASS
14 17 28 31 35 38 43 46

4 matches found in sequence:
abu56844 ; BoNT/A Hc binding antibody scTv VH region from 1A1 #2.
(from "bt_ags.pep")
TOIG of: abu56844 check: 1191 from: 1 to: 57

ID ABU56844 standard; protein; 57 AA.
XX
AC ABU56844;
XX
XX
DT 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VH region from 1A1 #2.
DE
XX

Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region; scFv; antibody; botulism; antibacterial; single chain antibody; VH; immunoglobulin.

Mus sp.
US2002155114-A1.
24-OCT-2002.
31-AUG-1998; 98US-00144886.
31-AUG-1998; 98US-00144886.
(MARK/) MARKS J D.
(AMER/) AMERSDORFER P.
Marks JD, Amersdorfer P;
WPI; 2003-182618/18.

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 22; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C35, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 57 AA;
ABU56844 Length: 57 August 31, 2004 14:39 Type: P Check: 1191 ..
Found using 'seq23' (hayes346.key)

1 RFTISRDNKNTLYLQMSLKSDEMTAMCYVRHGYGNYPHSHWYFDVWGAGTTVTSS
14 17 28 31 35 38 43 46

4 matches found in sequence:
abu56845 ; BoNT/A Hc binding antibody scTv VH region from 1B3 #2.
(from "bt_ags.pep")
TOIG of: abu56845 check: 6644 from: 1 to: 56

ID ABU56845 standard; protein; 56 AA.
XX
AC ABU56845;
XX
XX
DT 04-APR-2003 (first entry)
XX
XX BoNT/A Hc binding antibody scTv VH region from 1B3 #2.
DE
XX

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
OS Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX Claim 22; Page 23; 31pp; English.
XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody that specifically binds to the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism.
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention
XX Sequence 56 AA;
ABU56845 Length: 56 August 31, 2004 14:39 Type: P Check: 6644 ..
Found using 'seq23' (hayes346.key)
1 RETISRDNKNTLYLQNSLRADTAIVYCARDSGEYFYGGMDVWGQGTIVVSS
14 17 28 31 38 41 40 43

4 matches found in sequence:
abu56846 ; BoNT/A Hc binding antibody scTv VH region from 1F3 #2.
(from "bt_ags pep")
TOIG of: abu56846 check: 3500 from: 1 to: 53
ID ABU56846 standard; protein; 53 AA.
XX ABU56846;
XX 04-APR-2003 (first entry)
XX

DE BoNT/A Hc binding antibody scTv VH region from 1F3 #2.
XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulism.
XX Claim 22; Page 23; 31pp; English.
XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody that specifically binds to the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism.
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention
XX Sequence 53 AA;
ABU56846 Length: 53 August 31, 2004 14:39 Type: P Check: 3500 ..
Found using 'seq23' (hayes346.key)
1 KATLTVDKPSSTAYMELSLTSEDSAVYICAREAYGYNFDMVWGTTTVVSS
14 17 28 31 35 38 37 40

1 match found in sequence:
abu56848 ; BoNT/A Hc binding antibody scTv VL region from 1A1 #2.
(from "bt_ags pep")
TOIG of: abu56848 check: 8750 from: 1 to: 53
ID ABU56848 standard; protein; 53 AA.
XX ABU56848;
XX 04-APR-2003 (first entry)
XX

DT 04-APR-2003 (first entry)
 XX BoNT/A Hc binding antibody scTv VH region from 1B6 #1.
 XX
 XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.
 XX
 OS Mus sp.
 XX
 XX US2002155114-A1.
 XX
 XX 24-OCT-2002.
 XX
 XX 31-AUG-1998; 98US-00144886.
 XX
 XX 31-AUG-1998; 98US-00144886.
 XX
 XX (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.
 XX
 XX Marks JD, Amersdorfer P;
 XX WPI; 2003-182618/18.
 XX
 XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX
 XX Claim 6; Page 22; 3lpp; English.
 XX
 XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX Sequence 66 AA;
 SQ
 ABUS6855 Length: 66 August 31, 2004 14:39 Type: P Check: 1949 ..
 Found using 'seq23' (hayes346.key)

1 QVQKQSGAELVRPGVSVKISKCKSGYTFIDYAMHWKQSPAKSLEWIGVSYGDTDY
 27 30
 --|
 61 NPKFKG 63

2 matches found in sequence:
 abu56856 ; BoNT/A Hc binding antibody scTv VH region from 1C9 #1.
 (from "bt_ags.pep")
 TOIG of: abu56856 check: 2108 from: 1 to: 66

ID ABUS6856 standard; protein; 66 AA.
 XX
 XX AC ABUS6856;
 XX
 XX DT 04-APR-2003 (first entry)
 XX
 XX DE BoNT/A Hc binding antibody scTv VH region from 1C9 #1.
 XX
 XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.
 XX
 OS Mus sp.
 XX
 XX US2002155114-A1.
 XX
 XX 24-OCT-2002.
 XX
 XX 31-AUG-1998; 98US-00144886.
 XX
 XX 31-AUG-1998; 98US-00144886.
 XX
 XX (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.
 XX
 XX Marks JD, Amersdorfer P;
 XX WPI; 2003-182618/18.
 XX
 XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX
 XX Claim 6; Page 22; 3lpp; English.
 XX
 XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX Sequence 66 AA;
 SQ
 ABUS6856 Length: 66 August 31, 2004 14:39 Type: P Check: 2108 ..
 Found using 'seq23' (hayes346.key)

1 QVQKQSGAELVRPGVSVKISKCKSGYTFIDYAMHWKQSHAKSLEWIGVISTYGDADY
 27 30
 --|
 61 NPKFKG 55 58

1 match found in sequence:
 abu56857 ; BoNT/A Hc binding antibody scTv VH region from 1E8 #1.
 (from "bt_ags.pep")

Thu Sep 2 08:56:11 2004

abu56858 ; BoNT/A Hc binding antibody scTv VH region from 1G7 #1.

(from "bt ags.pep")

TOIG of: abu56858 check: 3741 from: 1 to: 65

ABU56858 standard; protein; 65 AA.

ID XX
AC XX
XX XX
DT XX
XX XX
DE XX
XX XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX XX
OS Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX

Claim 6; Page 22; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 65 AA;

ABU56858 Length: 65 August 31, 2004 14:39 Type: P Check: 3741
Found using 'seq23' (hayes346.key)

1 EVQLQESGPGLVKPSQSLTCTVTGYSTIDYAWNIWIRQPGKKLEWMNGYISYSGSTGYN
50 53

61 PSLKS

2 matches found in sequence:

TOIG of: abu56857 check: 3344 from: 1 to: 65

ABU56857 standard; protein; 65 AA.

ID XX
AC XX
XX XX
DT XX
XX XX
DE XX
XX XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX XX
OS Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX 31-AUG-1998; 98US-00144886.
XX 31-AUG-1998; 98US-00144886.
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX

Claim 6; Page 22; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 65 AA;

ABU56857 Length: 65 August 31, 2004 14:39 Type: P Check: 3344
Found using 'seq23' (hayes346.key)

1 EVQLQESGPGLVKPSQSLTCTVTGYSTIDYAWNIWIRQPGKKLEWMNGYISYSGSTGYN
50 53

61 PSLKS

1 match found in sequence:
abu56859 ; BoNT/A Hc binding antibody scTv VH region from 1F1 #1.
(from "bt_ags.pep")
TOIG of: abu56859 check: 2361 from: 1 to: 66

ID ABU56859 standard; protein; 66 AA.
XX AC ABU56859;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from 1F1 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX PI WPI; 2003-182618/18.
XX DR Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by the antibody, where the polypeptide is not
XX CC novel clones and isolating an antibody expressed by any of the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX CC chain variable region complementarity determining region) and with a
XX CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX CC antibody binds to a different epitope than the first anti-BoNT/A
XX CC antibody. The antibody is useful in the treatment of pathologies
XX CC associated with botulinum neurotoxin poisoning, for rapid
XX CC detection/diagnosis of botulism and in the detection and/or
XX CC quantification of BoNT/A in a biological sample obtained from an organism
XX CC which is indicative of a Clostridium botulinum infection of the organism.
XX CC The present sequence is a heavy chain variable region (VH) of a single
XX CC chain antibody (scFv) of the invention
XX Sequence 66 AA;

ABU56859 Length: 66 August 31, 2004 14:39 Type: P Check: 2361 ..
Found using 'seq23' (hayes346.key)

...

7 SGGGLVQPGSLKLSAASGFTFSNYGMSWVRQTPDKRLIEWAMISSGGSYNYSDSVKVG
|---|

67

2 matches found in sequence:
abu56860 ; BoNT/A Hc binding antibody scTv VH region from C39 #1.
(from "bt_ags.pep")
TOIG of: abu56860 check: 2240 from: 1 to: 66

ID ABU56860 standard; protein; 66 AA.
XX AC ABU56860;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from C39 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX PI WPI; 2003-182618/18.
XX DR Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H₂C fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by the antibody, where the polypeptide is not
XX CC novel clones and isolating an antibody expressed by any of the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX CC chain variable region complementarity determining region) and with a
XX CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX CC antibody binds to a different epitope than the first anti-BoNT/A
XX CC antibody. The antibody is useful in the treatment of pathologies
XX CC associated with botulinum neurotoxin poisoning, for rapid
XX CC detection/diagnosis of botulism and in the detection and/or
XX CC quantification of BoNT/A in a biological sample obtained from an organism
XX CC which is indicative of a Clostridium botulinum infection of the organism.
XX CC The present sequence is a heavy chain variable region (VH) of a single
XX CC chain antibody (scFv) of the invention
XX Sequence 66 AA;

ABU56860 Length: 66 August 31, 2004 14:39 Type: P Check: 2240 ..
Found using 'seq23' (hayes346.key)

Found using 'seq23' (hayes346.key)

1 QVQLQESGGSLVPGGSLKLSCAASGFTFSDYIMSWVRQTPKRLKLEWVAITSDGGSYTY
32 35 57 60
33 36

61 PDSVKG

1 match found in sequence:
abu56862 ; BoNT/A Hc binding antibody scTv VH region from 2G5 #1.
(from "bt.ags.pep")
TOIG of: abu56862 check: 1873 from: 1 to: 66

ID ABU56862 standard; protein; 66 AA.

XX AC ABU56862;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from 2G5 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.

XX OS Mus sp.

XX FN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

PI Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX Claim 6; Page 22; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention

1 QVQLQESGGSLVPGGSLKLSCAASGFTFSDYIMSWVRQTPKRLKLEWVAITSDGGSYTY
33 36 57 60

61 PDSVKG

3 matches found in sequence:
abu56861 ; BoNT/A Hc binding antibody scTv VH region from C25 #1.
(from "bt.ags.pep")
TOIG of: abu56861 check: 2373 from: 1 to: 66

ID ABU56861 standard; protein; 66 AA.

XX AC ABU56861;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VH region from C25 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.

XX OS Mus sp.

XX FN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

PI Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX Claim 6; Page 22; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin Hc fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with
XX an epitope specifically bound by an antibody expressed by any of the
XX novel clones and isolating an antibody that specifically binds to the
XX epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
XX chain variable region complementarity determining region) and with a
XX second anti-BoNT/A antibody which comprises a VH CDR, where the second
XX antibody binds to a different epitope than the first anti-BoNT/A
XX antibody. The antibody is useful in the treatment of pathologies
XX associated with botulinum neurotoxin poisoning, for rapid
XX detection/diagnosis of botulism and in the detection and/or
XX quantification of BoNT/A in a biological sample obtained from an organism
XX which is indicative of a Clostridium botulinum infection of the organism.
XX The present sequence is a heavy chain variable region (VH) of a single
XX chain antibody (scFv) of the invention

XX Sequence 66 AA;

SQ ABU56861 Length: 66 August 31, 2004 14:39 Type: P Check: 2373 ..

XX SQ Sequence 66 AA;
ABU56862 Length: 66 August 31, 2004 14:39 Type: P Check: 1873 ..
Found using 'seq23' (hayes346.key)
...
7 SGGGLVKPGSLKLSAASGFTFSSYMSWVRQTPEKRLWVATISDGGTYTYTNDVKG
57 60

1 match found in sequence:
abu56863 ; BoNT/A Hc binding antibody scTv VH region from 3C3 #1.
(from "bt_ags.pep")
TOIG of: abu56863 check: 1848 from: 1 to: 66
ID ABU56863 standard; protein; 66 AA.
XX AC ABU56863;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from 3C3 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX DR WPI; 2003-182618/18.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC detection/diagnosis of botulism and in the detection and/or

CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX SQ Sequence 66 AA;
ABU56863 Length: 66 August 31, 2004 14:39 Type: P Check: 1848 ..
Found using 'seq23' (hayes346.key)
...
7 SGGGLVKPGSLKLSAASGFTFSSYMSWVRQTPEKRLWVATISDGGTYTYTNDVKG
57 60

1 match found in sequence:
abu56867 ; BoNT/A Hc binding antibody scTv VH region from 2B6 #1.
(from "bt_ags.pep")
TOIG of: abu56867 check: 2155 from: 1 to: 65
ID ABU56867 standard; protein; 65 AA.
XX AC ABU56867;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VH region from 2B6 #1.
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
XX KW immunoglobulin.
XX OS Mus sp.
XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.
XX PI Marks JD, Amersdorfer P;
XX DR WPI; 2003-182618/18.
XX PS Claim 6; Page 22; 31pp; English.
XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second

Thu Sep 2 08:56:11 2004

CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX
SQ Sequence 65 AA;

ABU56867 Length: 65 August 31, 2004 14:39 Type: P Check: 2155 ..
Found using 'seq23' (hayes346.key)

1 VKLVESGFLVKPQSLSLCTCTVGTYSITSDYAWNWIRQFPFNKLEWMGYINDGSNNYN
50 53

61 PSLKN

1 match found in sequence:
abu56871; BoNT/A Hc binding antibody scTv VL region from C9 #1.
(from 'bct_ags.pep')
TOIG of: abu56871 check: 1782 from: 1 to: 55

ID ABU56871 standard; protein; 55 AA.
XX
AC ABU56871;
XX
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from C9 #1.
XX
XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
XX US2002155114-A1.
PN
XX
PD 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
PF
XX
XX 31-AUG-1998; 98US-00144886.
PR
XX
XX (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
PA
XX
XX Marks JD, Amersdorfer P;
PI
XX
XX WPI; 2003-182618/18.
DR
XX
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
PT
XX
XX Claim 9; Page 22; 31pp; English.

PS The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody that specifically binds to the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a light chain variable region (VL) of a single
CC chain antibody (scFv) of the invention
XX
XX
SQ Sequence 55 AA;

ABU56871 Length: 55 August 31, 2004 14:39 Type: P Check: 1782 ..
Found using 'seq23' (hayes346.key)

1 DIETQSPALMSSSPGKVIITCSASSSVSYMHWFQOKPGTSPKPIWYSTGNLAS
31 34

1 match found in sequence:
abu56873; BoNT/A Hc binding antibody scTv VL region from C1 #1.
(from 'bct_ags.pep')
TOIG of: abu56873 check: 1736 from: 1 to: 55

ID ABU56873 standard; protein; 55 AA.
XX
AC ABU56873;
XX
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from C1 #1.
XX
XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
XX US2002155114-A1.
PN
XX
PD 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
PF
XX
XX 31-AUG-1998; 98US-00144886.
PR
XX
XX (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
PA
XX
XX Marks JD, Amersdorfer P;
PI
XX
XX WPI; 2003-182618/18.
DR
XX
XX Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
PT
XX
XX Claim 9; Page 22; 31pp; English.

PS The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody that specifically binds to the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
XX
SQ Sequence 55 AA;

ABU56873 Length: 55 August 31, 2004 14:39 Type: P Check: 1736 ..
Found using 'seq23' (hayes346.key)

1 DIETQSPAIMSAPGKVINWTCSSSVSYMYQQKPGSGSPRLIIYDTSNLAS
31 34

1 match found in sequence:
abu56877 ; BoNT/A Hc binding antibody scTv VL region from 1E8 #1.
(from "bt_ags.pep")
TOIG of: abu56877 check: 1645 from: 1 to: 55

ID ABU56877 standard; protein; 55 AA.
XX AC ABU56877;
XX AC ABU56877;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VL region from 1E8 #1.
XX DE Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX KW immunoglobulin.
XX OS Mus sp.

XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;
XX DR WPI; 2003-182618/18.
XX PT Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 9; Page 22; 3lpp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H₃C fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by an antibody expressed by any of the
XX CC novel clones and isolating an antibody that specifically binds to the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
XX
SQ Sequence 55 AA;

ABU56877 Length: 55 August 31, 2004 14:39 Type: P Check: 1645 ..
Found using 'seq23' (hayes346.key)

1 DIETQSPAIMSAPGKVINWTCSSSVSYMYQQKPGSGTSPKRWIYDTSKLAS
31 34

1 match found in sequence:
abu56878 ; BoNT/A Hc binding antibody scTv VL region from 1G7 #1.
(from "bt_ags.pep")
TOIG of: abu56878 check: 1645 from: 1 to: 55

ID ABU56878 standard; protein; 55 AA.
XX AC ABU56878;
XX AC ABU56878;
XX DT 04-APR-2003 (first entry)
XX DE BoNT/A Hc binding antibody scTv VL region from 1G7 #1.
XX DE Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX KW immunoglobulin.
XX OS Mus sp.

XX PN US2002155114-A1.
XX PD 24-OCT-2002.
XX PF 31-AUG-1998; 98US-00144886.
XX PR 31-AUG-1998; 98US-00144886.
XX PA (MARK/) MARKS J D.
XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;
XX DR WPI; 2003-182618/18.
XX PT Novel antibody that specifically binds and neutralizes botulinum
XX PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX PT treating botulism.
XX PS Claim 9; Page 22; 3lpp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
XX CC an epitope specifically bound by an antibody expressed by a clone such as
XX CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX CC which is specifically bound by the antibody, where the polypeptide is not
XX CC a full-length botulinum neurotoxin H₃C fragment and making an anti-BoNT/A
XX CC antibody that neutralises BoNT/A (by contacting several antibodies with
XX CC an epitope specifically bound by an antibody expressed by any of the
XX CC novel clones and isolating an antibody that specifically binds to the
XX CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
XX CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX Sequence 55 AA;

ABU56878 Length: 55 August 31, 2004 14:39 Type: P Check: 1645 ..
Found using 'seq23' (hayes346.key)

1 DIELTQSPAIMSAPGKVTTCSSASSSVSYMHVYQOKSGTSPKRWIYDTSKLAS
31 34

1 match found in sequence:

abu56882 ; BoNT/A Hc binding antibody scTv VL region from 2G5 #1.
(from "bt_ags.pep")
TOIG of: abu56882 check: 1851 from: 1 to: 55

ID ABU56882 standard; protein; 55 AA.

XX AC ABU56882;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 2G5 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX Sequence 55 AA;

ABU56882 Length: 55 August 31, 2004 14:39 Type: P Check: 1851 ..
Found using 'seq23' (hayes346.key)

1 DIELTQSPAIMSAPGKVTTCSSASSSVSYMHVYQOKSGTSPKLIWYSTSNLAS
31 34

1 match found in sequence:

abu56884 ; BoNT/A Hc binding antibody scTv VL region from 3F4 #1.
(from "bt_ags.pep")
TOIG of: abu56884 check: 2125 from: 1 to: 55

ID ABU56884 standard; protein; 55 AA.

XX AC ABU56884;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scTv VL region from 3F4 #1.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
XX scFv; antibody; botulism; antibacterial; single chain antibody; VL;
XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.

XX PS Claim 9; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H_c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with
CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
XX
SQ Sequence 55 AA;

ABU56884 Length: 55 August 31, 2004 14:39 Type: P Check: 2125 ..
Found using 'seq23' (hayes346.key)

1 DTELTPAIVMSAPGKVTTCRASSSVSYMYQQKPGSPRLIIYDTSNLAS
31 34

1 match found in sequence:
abu56885 ; BoNT/A Hc binding antibody scTv VL region from 3H4 #1.
(from "bt_ags.pep")
TOIG of: abu56885 check: 675 from: 1 to: 57

ID ABU56885 standard; protein; 57 AA.
XX
AC ABU56885;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 3H4 #1.
DE
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.

XX Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
XX
SQ Sequence 57 AA;

ABU56885 Length: 57 August 31, 2004 14:39 Type: P Check: 675 ..
Found using 'seq23' (hayes346.key)

1 DIELTQPAIVMSAPGKVTTCRASSSVSYLHWYQQKPGSPRLIIYDTSNLAS
33 36

1 match found in sequence:
abu56887 ; BoNT/A Hc binding antibody scTv VL region from 2B6 #1.
(from "bt_ags.pep")
TOIG of: abu56887 check: 252 from: 1 to: 60

ID ABU56887 standard; protein; 60 AA.
XX
AC ABU56887;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 2B6 #1.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
KW immunoglobulin.

XX Mus sp.
XX US2002155114-A1.
XX 24-OCT-2002.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX 31-AUG-1998; 98US-00144886.
XX
XX (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX Marks JD, Amersdorfer P;
XX
XX WPI; 2003-182618/18.
XX

Novel antibody that specifically binds and neutralizes botulinum neurotoxin type A useful for neutralizing botulinum neurotoxin and treating botulism.

Claim 9; Page 23; 31pp; English.

The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy

chain variable region complementarity determining region) and with a second anti-Bont/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-Bont/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of Bont/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 60 AA;
 ABUS6887 Length: 60 August 31, 2004 14:39 Type: P Check: 252 ..
 Found using 'seq23' (hayes346.key)

1 YIELTQSPASLAVSLGQRATTSCTV VL region from 2E8 #1.
 1 4
 ---|---|
 33 36

3 matches found in sequence:
 abu56891 ; Bont/A Hc binding antibody scTv VL region from 2E8 #1.
 (from "bt_ags.pep")
 TOIG of: abu56890 check: 9244 from: 1 to: 57

ID ABUS6890 standard; protein; 57 AA.
 XX
 AC ABUS6890;
 XX
 DT 04-APR-2003 (first entry)
 XX
 DE Bont/A Hc binding antibody scTv VL region from 2E8 #1.
 XX
 KW Botulinum neurotoxin type A; Bont/A; mouse; light chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
 KW immunoglobulin.
 XX
 OS Mus sp.
 XX
 FN US2002155114-A1.
 XX
 PD 24-OCT-2002.
 XX
 PF 31-AUG-1998; 98US-00144886.
 XX
 PR 31-AUG-1998; 98US-00144886.
 XX
 PA (MARK/) MARKS J D.
 PA (AMER/) AMERSDORFER P.
 XX
 PI Marks JD, Amersdorfer P;
 XX
 DR WPI; 2003-182618/18.
 XX
 PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX
 PS Claim 9; Page 23; 31pp; English.
 XX
 CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (Bont/A). Also included are a
 CC polypeptide comprising Bont/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin Hc fragment and making an anti-Bont/A
 CC antibody that neutralises Bont/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

epitope). The antibody is useful for neutralising a Bont/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-Bont/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-Bont/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of Bont/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 57 AA;
 ABUS6890 Length: 57 August 31, 2004 14:39 Type: P Check: 9244 ..
 Found using 'seq23' (hayes346.key)

1 DIELTQSTTMAASPGEXKITITCSASSISGNYLHWYQQKPGFSPKLLIYRTSNLAS
 1 4
 ---|---|
 33 36

3 matches found in sequence:
 abu56891 ; Bont/A Hc binding antibody scTv VH region from C9 #2.
 (from "bt_ags.pep")
 TOIG of: abu56891 check: 121 from: 1 to: 52

ID ABUS6891 standard; protein; 52 AA.
 XX
 AC ABUS6891;
 XX
 DT 04-APR-2003 (first entry)
 XX
 DE Bont/A Hc binding antibody scTv VH region from C9 #2.
 XX
 KW Botulinum neurotoxin type A; Bont/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.
 XX
 OS Mus sp.
 XX
 FN US2002155114-A1.
 XX
 PD 24-OCT-2002.
 XX
 PF 31-AUG-1998; 98US-00144886.
 XX
 PR 31-AUG-1998; 98US-00144886.
 XX
 PA (MARK/) MARKS J D.
 PA (AMER/) AMERSDORFER P.
 XX
 PI Marks JD, Amersdorfer P;
 XX
 DR WPI; 2003-182618/18.
 XX
 PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.
 XX
 PS Claim 22; Page 23; 31pp; English.
 XX
 CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (Bont/A). Also included are a
 CC polypeptide comprising Bont/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin Hc fragment and making an anti-Bont/A
 CC antibody that neutralises Bont/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX Sequence 52 AA;

ABU56891 Length: 52 August 31, 2004 14:39 Type: P Check: 121 ..
 Found using 'seq23' (hayes346.key)

1 MATLTVDKSSSTAYMQLSSPTSCARGIYVYVDGNYVAMDYWGQGTTLTVSS
 14 17 28 31 36 39

 4 matches found in sequence:

abu56892 ; BoNT/A Hc binding antibody scFv VH region from 1D5 #2.
 (from "bt_ags.pep")

TOIG of: abu56892 check: 1643 from: 1 to: 59

ID ABU56892 standard; protein; 59 AA.

XX AC ABU56892;

XX DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VH region from 1D5 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

OS Mus sp.

XX US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

PA (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₃C fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX Sequence 59 AA;

ABU56892 Length: 59 August 31, 2004 14:39 Type: P Check: 1643 ..
 Found using 'seq23' (hayes346.key)

1 KATLTVDKSSSTAYMQLSSPTSCARGIYVYVDGNYVYTLDYWGQGTTLTVSS
 14 17 28 31 35 38 43 46

 3 matches found in sequence:

abu56893 ; BoNT/A Hc binding antibody scFv VH region from C1 #2.
 (from "bt_ags.pep")

TOIG of: abu56893 check: 2318 from: 1 to: 55

ID ABU56893 standard; protein; 55 AA.

XX AC ABU56893;

XX DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VH region from C1 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

OS Mus sp.

XX US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.

PA (AMER/) AMERSDORFER P.

XX Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H₃C fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with
 CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the

CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 55 AA;
SQ

ABU56893 Length: 55 August 31, 2004 14:39 Type: P Check: 2318 ..
Found using 'seq23' (hayes346.key)

1 KATLTVDRTSSSTAIHQSSPTSDSASVYICARGLYGFGWFDVWGQGTVTTVSS
28 31 37 40 41 44
|---| |---| |---|

4 matches found in sequence:
abu56894 ; BoNT/A Hc binding antibody scTv VH region from S25 #2.
(from "bt_ags.pep")
TOIG of: abu56894 check: 8151 from: 1 to: 54

ID ABU56894 standard; protein; 54 AA.
XX
AC ABU56894;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from S25 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
CC novel clones and isolating an antibody that specifically binds to the
CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
CC chain variable region complementarity determining region) and with a
CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
CC antibody binds to a different epitope than the first anti-BoNT/A
CC antibody. The antibody is useful in the treatment of pathologies
CC associated with botulinum neurotoxin poisoning, for rapid
CC detection/diagnosis of botulism and in the detection and/or
CC quantification of BoNT/A in a biological sample obtained from an organism
CC which is indicative of a Clostridium botulinum infection of the organism.
CC The present sequence is a heavy chain variable region (VH) of a single
CC chain antibody (scFv) of the invention
XX
XX Sequence 54 AA;
SQ

ABU56894 Length: 54 August 31, 2004 14:39 Type: P Check: 8151 ..
Found using 'seq23' (hayes346.key)

1 KATLTVDRTSSSTAYMQLSSPTSDSASVYICARGLYNGFWFDVWGQGTVTTVSS
14 17 28 31 35 38 43
|---| |---| |---| |---|

2 matches found in sequence:
abu56895 ; BoNT/A Hc binding antibody scTv VH region from 1B6 #2.
(from "bt_ags.pep")
TOIG of: abu56895 check: 3665 from: 1 to: 51

ID ABU56895 standard; protein; 51 AA.
XX
AC ABU56895;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from 1B6 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
PI WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
XX an epitope specifically bound by an antibody expressed by a clone such as
XX clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
XX neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
XX polypeptide comprising BoNT/A neutralising epitope comprising an epitope
XX which is specifically bound by the antibody, where the polypeptide is not
XX a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
XX antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX
 SQ Sequence 51 AA;

ABU56895 Length: 51 August 31, 2004 14:39 Type: P Check: 3665 ..
 Found using 'seq23' (hayes346.key)

1 KATLVNKKSSNTAYWEELRLTSDSAIYYCARRGKGAMDYWGQGTFTVTVSS
 14 17 28 31

 2 matches found in sequence:

abu56896 ; BoNT/A Hc binding antibody scFv VH region from 1C9 #2.
 (from "bt_ags.pep")

TOIG of: abu56896 check: 3982 from: 1 to: 51

ID ABU56896 standard; protein; 51 AA.

XX AC ABU56896;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VH region from 1C9 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 XX
 SQ Sequence 51 AA;

ABU56896 Length: 51 August 31, 2004 14:39 Type: P Check: 3982 ..
 Found using 'seq23' (hayes346.key)

1 KATLVNKKSSNTAYWEELRLTSDSAIYYCARRGKGAMDYWGQGTFTVTVSS
 14 17 28 31

 2 matches found in sequence:

abu56897 ; BoNT/A Hc binding antibody scFv VH region from 1E8 #2.
 (from "bt_ags.pep")

TOIG of: abu56897 check: 719 from: 1 to: 50

ID ABU56897 standard; protein; 50 AA.

XX AC ABU56897;

XX DT 04-APR-2003 (first entry)

XX DE BoNT/A Hc binding antibody scFv VH region from 1E8 #2.

XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 XX scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 XX immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.
 XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H.c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

Thu Sep 2 08:56:11 2004

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 50 AA;

ABU56898 Length: 50 August 31, 2004 14:39 Type: P Check: 761 ..
Found using 'seq23' (hayes346.key)

1 RISITRDTSKNQFFLQLNSVTETGTYYCARGYDAMDYWGQGTSTVTVSS
28 31 34 37

3 matches found in sequence:
abu56899 ; BoNT/A Hc binding antibody scTv VH region from 1F1 #2.
(from "bt_ags.pep")
TOIG of: abu56899 check: 1526 from: 1 to: 57

ID ABU56899 standard; protein; 57 AA.
XX
AC ABU56899;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from 1F1 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 50 AA;

ABU56897 Length: 50 August 31, 2004 14:39 Type: P Check: 719 ..
Found using 'seq23' (hayes346.key)

1 RISITKDTSKNQFFLQLNSVTETGTYYCARGYDAMDYWGQGTSTVTVSS
28 31 34 37

2 matches found in sequence:
abu56898 ; BoNT/A Hc binding antibody scTv VH region from 1G7 #2.
(from "bt_ags.pep")
TOIG of: abu56898 check: 761 from: 1 to: 50

ID ABU56898 standard; protein; 50 AA.
XX
AC ABU56898;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VH region from 1G7 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX
DR WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulism.
XX
PS Claim 22; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 57 AA;

ABU56899 Length: 57 August 31, 2004 14:39 Type: P Check: 1526 ..
 Found using 'seq23' (hayes346.key)

```

1  RVTTISRDNAKSTLYLQMSLQSEDYAMVLCTRYGYGNPSPHWYFDVWGAGTTVTVSS
    14 17      |---|      |---|      |---|
    35 38 43 46

```

 2 matches found in sequence:
 abu56900 ; BoNT/A Hc binding antibody scTv VH region from C39 #2.
 (from "bt_ags pep")

TOIG of: abu56900 check: 9469 from: 1 to: 52

ID ABU56900 standard; protein; 52 AA.

XX AC ABU56900;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scTv VH region from C39 #2.

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 52 AA;

ABU56900 Length: 52 August 31, 2004 14:39 Type: P Check: 9469 ..
 Found using 'seq23' (hayes346.key)

```

1  RFTISRDNAKNLYLQMSLKSLEDYAIYCVRYRYDEGLDYWGQTTVTVSS
    14 17      |---|      |---|      |---|
    28 31

```

 2 matches found in sequence:

abu56901 ; BoNT/A Hc binding antibody scTv VH region from C25 #2.
 (from "bt_ags pep")

TOIG of: abu56901 check: 9258 from: 1 to: 52

ID ABU56901 standard; protein; 52 AA.

XX AC ABU56901;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scTv VH region from C25 #2.

KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VH;
 KW immunoglobulin.

XX OS Mus sp.

XX PN US2002155114-A1.

XX PD 24-OCT-2002.

XX PF 31-AUG-1998; 98US-00144886.

XX PR 31-AUG-1998; 98US-00144886.

XX PA (MARK/) MARKS J D.

XX PA (AMER/) AMERSDORFER P.

XX PI Marks JD, Amersdorfer P;

XX DR WPI; 2003-182618/18.

XX PT Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX PS Claim 22; Page 23; 31pp; English.

XX The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

Thu Sep 2 08:56:11 2004

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinum and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 52 AA;
ABU56902 Length: 52 August 31, 2004 14:39 Type: P Check: 8869 ..
Found using 'seq23' (hayes346.key)

1 RFTISRDNKNNLYLQMSLKSSEDTAMYYCSRYRYYDDMDYWGQGTSTVTVSS
14 17 14 17 28 31 36 39

2 matches found in sequence:
abu56903 ; BoNT/A Hc binding antibody scTv VH region from 2B6 #2.
(from "bt_ags.pep")
TOIG of: abu56903 check: 7963 from: 1 to: 54

ID ABU56903 standard; protein; 54 AA.
XX
XX AC ABU56903;
XX
XX DT 04-APR-2003 (first entry)
XX
XX DE BoNT/A Hc binding antibody scTv VH region from 2B6 #2.
XX
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX scFv; antibody; botulinum; antibacterial; single chain antibody; VH;
XX immunoglobulin.
XX
XX OS Mus sp.
XX
XX PN US2002155114-A1.
XX
XX PD 24-OCT-2002.
XX
XX PF 31-AUG-1998; 98US-00144886.
XX
XX PR 31-AUG-1998; 98US-00144886.
XX
XX PA (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX PI Marks JD, Amersdorfer P;
XX
XX DR WPI; 2003-182618/18.
XX
XX PT Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulinum.
XX
XX PS Claim 22; Page 23; 31pp; English.
XX
XX CC The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinum and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a heavy chain variable region (VH) of a single chain antibody (scFv) of the invention

Sequence 52 AA;
ABU56901 Length: 52 August 31, 2004 14:39 Type: P Check: 9258 ..
Found using 'seq23' (hayes346.key)

1 RFTISRDNKNNLYLQMSLKSSEDTAMYYCSRYRYYDDMDYWGQGTSTVTVSS
14 17 14 17 35 38

3 matches found in sequence:
abu56902 ; BoNT/A Hc binding antibody scTv VH region from 2G5 #2.
(from "bt_ags.pep")
TOIG of: abu56902 check: 8869 from: 1 to: 52

ID ABU56902 standard; protein; 52 AA.
XX
XX AC ABU56902;
XX
XX DT 04-APR-2003 (first entry)
XX
XX DE BoNT/A Hc binding antibody scTv VH region from 2G5 #2.
XX
XX KW Botulinum neurotoxin type A; BoNT/A; mouse; heavy chain variable region;
XX scFv; antibody; botulinum; antibacterial; single chain antibody; VH;
XX immunoglobulin.
XX
XX OS Mus sp.
XX
XX PN US2002155114-A1.
XX
XX PD 24-OCT-2002.
XX
XX PF 31-AUG-1998; 98US-00144886.
XX
XX PR 31-AUG-1998; 98US-00144886.
XX
XX PA (MARK/) MARKS J D.
XX (AMER/) AMERSDORFER P.
XX
XX PI Marks JD, Amersdorfer P;
XX
XX DR WPI; 2003-182618/18.
XX
XX PT Novel antibody that specifically binds and neutralizes botulinum
XX neurotoxin type A useful for neutralizing botulinum neurotoxin and
XX treating botulinum.
XX
XX PS Claim 22; Page 23; 31pp; English.
XX
XX CC The invention relates to an isolated antibody that specifically binds to an epitope specifically bound by an antibody expressed by a clone such as clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and neutralises botulinum neurotoxin type A (BoNT/A). Also included are a polypeptide comprising BoNT/A neutralising epitope comprising an epitope which is specifically bound by the antibody, where the polypeptide is not a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a heavy chain variable region (VH) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 54 AA;

ABU56903 Length: 54 August 31, 2004 14:39 Type: P Check: 7963 ..
 Found using 'seq23' (hayes346.Key)

1 RISITRDSKNQFFKLNSVTSEDTATYCCAGDGYYVDVYWGVTGTTIVVSS
 28 31 38 41

2 matches found in sequence:

abu56904 ; BoNT/A Hc binding antibody scFv VH region from 1G5 #2.
 (from "bt_ags pep")

TOIG of: abu56904 check: 3980 from: 1 to: 51

ID ABU56904 standard; protein; 51 AA.

XX
 AC ABU56904;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VH region from 1G5 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
 KW immunoglobulin.

XX Mus sp.

XX US2002155114-A1.

XX 24-OCT-2002.

XX 31-AUG-1998; 98US-00144886.

XX 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.

PI Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 22; Page 23; 31pp; English.

CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

CC an epitope specifically bound by an antibody expressed by any of the
 CC novel clones and isolating an antibody that specifically binds to the
 CC epitope). The antibody is useful for neutralising a BoNT/A, by contacting
 CC botulinum neurotoxin type A with the antibody comprising VH CDR (heavy
 CC chain variable region complementarity determining region) and with a
 CC second anti-BoNT/A antibody which comprises a VH CDR, where the second
 CC antibody binds to a different epitope than the first anti-BoNT/A
 CC antibody. The antibody is useful in the treatment of pathologies
 CC associated with botulinum neurotoxin poisoning, for rapid
 CC detection/diagnosis of botulism and in the detection and/or
 CC quantification of BoNT/A in a biological sample obtained from an organism
 CC which is indicative of a Clostridium botulinum infection of the organism.
 CC The present sequence is a light chain variable region (VL) of a single
 CC chain antibody (scFv) of the invention
 XX
 SQ Sequence 51 AA;

ABU56904 Length: 51 August 31, 2004 14:39 Type: P Check: 3980 ..
 Found using 'seq23' (hayes346.Key)

1 KATLTVDTSSTAYMQLSLSLTSSEDSAVYCYCARLGDLADADVYWGQTSIVVSS
 14 17 28 31

1 match found in sequence:

abu56905 ; BoNT/A Hc binding antibody scFv VL region from C9 #2.
 (from "bt_ags pep")

TOIG of: abu56905 check: 5919 from: 1 to: 52

ID ABU56905 standard; protein; 52 AA.

XX
 AC ABU56905;

DT 04-APR-2003 (first entry)

DE BoNT/A Hc binding antibody scFv VL region from C9 #2.

XX Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
 KW scFv; antibody; botulism; antibacterial; single chain antibody; VL;
 KW immunoglobulin.

XX Mus sp.

XX US2002155114-A1.

XX 24-OCT-2002.

XX 31-AUG-1998; 98US-00144886.

XX 31-AUG-1998; 98US-00144886.

XX (MARK/) MARKS J D.
 XX (AMER/) AMERSDORFER P.

PI Marks JD, Amersdorfer P;

XX WPI; 2003-182618/18.

XX Novel antibody that specifically binds and neutralizes botulinum
 PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
 PT treating botulism.

XX Claim 8; Page 23; 31pp; English.

CC The invention relates to an isolated antibody that specifically binds to
 CC an epitope specifically bound by an antibody expressed by a clone such as
 CC clone S25, C25, C39, 1C6 and clone 1F3, where the antibody binds to and
 CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
 CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
 CC which is specifically bound by the antibody, where the polypeptide is not
 CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
 CC antibody that neutralises BoNT/A (by contacting several antibodies with

Thu Sep 2 08:56:11 2004

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 52 AA;

ABU56913 Length: 52 August 31, 2004 14:39 Type: P Check: 6002 ..
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSYSLTISRMEADAATYYCQQRSSYPYTFQFGDQAGNIK
|---|
40 43

1 match found in sequence:
abu56914 ; BoNT/A Hc binding antibody scTv VL region from 3C3 #2.
(from "bt_ags pep")
TOIG of: abu56914 check: 6418 from: 1 to: 52

ID ABU56914 standard; protein; 52 AA.
XX
AC ABU56914;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 3C3 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulinism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulinism.
XX
PS Claim 8; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, IC6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BoNT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BoNT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BoNT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulinism and in the detection and/or quantification of BoNT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

Sequence 52 AA;

ABU56905 Length: 52 August 31, 2004 14:39 Type: P Check: 5919 ..
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSYSLTISRMEADAATYYCQQRSSYPYTFQFGDQAGNIK
|---|
35 38

1 match found in sequence:
abu56913 ; BoNT/A Hc binding antibody scTv VL region from 2G5 #2.
(from "bt_ags pep")
TOIG of: abu56913 check: 6002 from: 1 to: 52

ID ABU56913 standard; protein; 52 AA.
XX
AC ABU56913;
XX
DT 04-APR-2003 (first entry)
XX
DE BoNT/A Hc binding antibody scTv VL region from 2G5 #2.
XX
KW Botulinum neurotoxin type A; BoNT/A; mouse; light chain variable region;
KW scFv; antibody; botulinism; antibacterial; single chain antibody; VL;
KW immunoglobulin.
XX
OS Mus sp.
XX
PN US2002155114-A1.
XX
PD 24-OCT-2002.
XX
PF 31-AUG-1998; 98US-00144886.
XX
PR 31-AUG-1998; 98US-00144886.
XX
PA (MARK/) MARKS J D.
PA (AMER/) AMERSDORFER P.
XX
PI Marks JD, Amersdorfer P;
XX WPI; 2003-182618/18.
XX
PT Novel antibody that specifically binds and neutralizes botulinum
PT neurotoxin type A useful for neutralizing botulinum neurotoxin and
PT treating botulinism.
XX
PS Claim 8; Page 23; 31pp; English.
XX
CC The invention relates to an isolated antibody that specifically binds to
CC an epitope specifically bound by an antibody expressed by a clone such as
CC clone S25, C25, C39, IC6 and clone 1F3, where the antibody binds to and
CC neutralises botulinum neurotoxin type A (BoNT/A). Also included are a
CC polypeptide comprising BoNT/A neutralising epitope comprising an epitope
CC which is specifically bound by the antibody, where the polypeptide is not
CC a full-length botulinum neurotoxin H c fragment and making an anti-BoNT/A
CC antibody that neutralises BoNT/A (by contacting several antibodies with

an epitope specifically bound by an antibody expressed by any of the novel clones and isolating an antibody that specifically binds to the epitope). The antibody is useful for neutralising a BONT/A, by contacting botulinum neurotoxin type A with the antibody comprising VH CDR (heavy chain variable region complementarity determining region) and with a second anti-BONT/A antibody which comprises a VH CDR, where the second antibody binds to a different epitope than the first anti-BONT/A antibody. The antibody is useful in the treatment of pathologies associated with botulinum neurotoxin poisoning, for rapid detection/diagnosis of botulism and in the detection and/or quantification of BONT/A in a biological sample obtained from an organism which is indicative of a Clostridium botulinum infection of the organism. The present sequence is a light chain variable region (VL) of a single chain antibody (scFv) of the invention

XX
SQ Sequence 52 AA;

ABU61532 Length: 52 August 31, 2004 14:39 Type: P Check: 6418
Found using 'seq23' (hayes346.key)

1 GVPARFSGSGTSLTISRMEADATYYCQQRSSYPYTPQGGDQAGNIS
40 43

1 match found in sequence:
abu61532 ; Botulinum type A neurotoxin leucine-based motif.
(from "bt_ags.pep")
TOIG of: abu61532 check: 2137 from: 1 to: 7

ID ABU61532 standard; peptide; 7 AA.

XX AC ABU61532;

XX DT 11-AUG-2003 (first entry)

DE Botulinum type A neurotoxin leucine-based motif.

XX Neurotoxin; analgesic; antispasmodic; antidiarrhoeal; cerebral palsy;
KW biological persistence; biological persistence enhancing component;
KW leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
KW spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
KW lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
KW strabismus; hemifacial spasm; eyelid disorder; focal spasticity; tics;
KW spasmodic colitis; neurogenic bladder; anismus; limb spasticity; tics;
KW tremors; bruxism; anal fissure; achalasia; dysphagia; lacrimation;
KW hyperhydrosis; salivation; gastrointestinal secretion; muscle spasm;
KW headache pain; brow furrow; skin wrinkle; spinal curvature;
KW inflammatory pain; autonomic nervous system disorder; asthma; spasm;
KW respiratory malfunctioning; chronic obstructive pulmonary disease;
KW botulinum type A neurotoxin.

XX OS Clostridium botulinum.

XX PN US2003027752-A1.

XX PD 06-FEB-2003.

XX PF 20-JUL-2001; 2001US-00910346.

XX PR 21-JUL-2000; 2000US-00620840.

XX PA (ALLR) ALLERGAN SALES INC.

XX PI Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX DR WPI; 2003-466155/44.

XX Novel modified neurotoxin with a structural modification that alters
PT biological persistence or activity of the modified neurotoxin relative to
PT the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.

PS Disclosure; Page 6; 33pp; English.

XX

CC The invention describes a modified neurotoxin (I) comprising a structural
CC modification that alters the biological persistence or biological
CC activity of the modified neurotoxin relative to an identical neurotoxin
CC without the structural modification (the modified neurotoxin is
CC structurally different from a naturally existing neurotoxin). (I) which
CC has altered biological persistence, is useful for treating a condition in
CC a mammal, where the neurotoxin does not comprise a leucine-based motif,
CC and the structural modification includes a biological persistence
CC enhancing component which comprises a leucine-based motif, tyrosine-based
CC motif or an amino acid derivative. (I) is useful for treating a condition
CC such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
CC dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
CC cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
CC hemifacial spasm, eyelid disorder, neurogenic bladder, cerebral palsy, focal spasticity,
CC tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,
CC hyperhydrosis, excessive salivation, excessive gastrointestinal
CC secretions, pain from muscle spasms, headache pain, brow furrows and skin
CC wrinkles. (I) is also useful for treating spinal curvature, various forms
CC of inflammatory pains, autonomic nervous system disorders, e.g., an
CC respiratory malfunctioning such as chronic obstructive pulmonary disease,
CC and asthma; pain not associated with a muscular disorder, such as spasm.
CC A unit amount of modified neurotoxin having altered biological activity
CC than natural neurotoxin, is more efficient to reduce exocytosis from a
CC cell than is a unit amount of naturally existing neurotoxin. This is the
CC amino acid sequence of a possible leucine-based motif derived from
CC Botulinum type A neurotoxin

SQ Sequence 7 AA;

ABU61532 Length: 7 August 31, 2004 14:39 Type: P Check: 2137
Found using 'seq23' (hayes346.key)

1 FEFYKLL
4 7

10 matches found in sequence:

abu61544 ; Botulinum type toxin A light chain.
(from "bt_ags.pep")

TOIG of: abu61544 check: 6765 from: 1 to: 437

ID ABU61544 standard; peptide; 437 AA.

XX AC ABU61544;

XX DT 11-AUG-2003 (first entry)

XX DE Botulinum type toxin A light chain.

XX Neurotoxin; analgesic; antispasmodic; antidiarrhoeal; cerebral palsy;
KW biological persistence; biological persistence enhancing component;
KW leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
KW spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
KW lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
KW strabismus; hemifacial spasm; eyelid disorder; focal spasticity;
KW tremors; bruxism; anal fissure; achalasia; dysphagia; lacrimation;
KW hyperhydrosis; salivation; gastrointestinal secretion; muscle spasm;
KW headache pain; brow furrow; skin wrinkle; spinal curvature;
KW inflammatory pain; autonomic nervous system disorder; asthma; spasm;
KW respiratory malfunctioning; chronic obstructive pulmonary disease;
KW botulinum type toxin A light chain.

XX OS Clostridium botulinum.

XX PN US2003027752-A1.

XX PD 06-FEB-2003.

XX PF 20-JUL-2001; 2001US-00910346.

Thu Sep 2 08:56:11 2004

374 KINIVPKVNTIYDGFNLRNTNLAANFNQNTENNMMFTKLNFTGLFFYKLLCVRGI
383
386
ITSK

434

7 matches found in sequence:
abu61545; Botulinum type toxin B Danish I light chain.

TOIG of: abu61545 check: 9222 from: 1 to: 441

ID ABU61545 standard; peptide; 441 AA.

XX AC ABU61545;

XX DT 11-AUG-2003 (first entry)

XX DE Botulinum type toxin B Danish I light chain.

XX Neurotoxin; analgesic; antispasmodic; antiinflammatory; cerebral palsy;
XX biological persistence; biological persistence enhancing component;
XX leucine-based motif; neuromuscular disorder; autonomic disorder; pain;
XX spasmodic dysphonia; laryngeal dystonia; oromandibular dysphonia;
XX lingual dystonia; cervical dystonia; focal hand dystonia; blepharospasm;
XX strabismus; hemifacial spasm; eyelid disorder; anismus; limb spasticity; tics;
XX spasmodic colitis; neurogenic bladder; achalasia; dysphagia; lacrimation;
XX tremors; bruxism; anal fissure; gastrointestinal secretion; muscle spasm;
XX hyperhidrosis; salivation; skin wrinkle; spinal curvature;
XX headache pain; brow furrow; skin wrinkle; spinal curvature;
XX inflammatory pain; autonomic nervous system disorder; asthma; spasm;
XX respiratory malfunctioning; chronic obstructive pulmonary disease;
XX botulinum type toxin B Danish I light chain.

XX Clostridium botulinum.

XX US2003027752-A1.

XX 06-FEB-2003.

XX 20-JUL-2001; 2001US-00910346.

XX 21-JUL-2000; 2000US-00620840.

XX (ALLR) ALLERGAN SALES INC.

XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;

XX WPI; 2003-466155/44.

XX Novel modified neurotoxin with a structural modification that alters
XX biological persistence or activity of the modified neurotoxin relative to
XX the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.

XX Disclosure; Fig 8; 33pp; English.

XX The invention describes a modified neurotoxin (I) comprising a structural
XX modification that alters the biological persistence or biological
XX activity of the modified neurotoxin relative to an identical neurotoxin
XX without the structural modification (the modified neurotoxin is
XX structurally different from a naturally existing neurotoxin). (I) which
XX has altered biological persistence, is useful for treating a condition in
XX a mammal, where the neurotoxin does not comprise a leucine-based motif,
XX and the structural modification includes a leucine-based motif, tyrosine-based
XX enhancing component which comprises a leucine-based motif, tyrosine-based
XX motif or an amino acid derivative. (I) is useful for treating a condition
XX such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
XX dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
XX cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
XX hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, tics,
XX spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics,
XX tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,

XX 21-JUL-2000; 2000US-00620840.
XX (ALLR) ALLERGAN SALES INC.
XX Steward LE, Fernandez-Salas E, Herrington TM, Aoki KR;
XX WPI; 2003-466155/44.
XX Novel modified neurotoxin with a structural modification that alters
XX biological persistence or activity of the modified neurotoxin relative to
XX the unmodified neurotoxin, for treating tremors, bruxism and dysphagia.
XX Disclosure; Fig 3; 33pp; English.

XX The invention describes a modified neurotoxin (I) comprising a structural
XX modification that alters the biological persistence or biological
XX activity of the modified neurotoxin relative to an identical neurotoxin
XX without the structural modification (the modified neurotoxin is
XX structurally different from a naturally existing neurotoxin). (I) which
XX has altered biological persistence, is useful for treating a condition in
XX a mammal, where the neurotoxin does not comprise a leucine-based motif,
XX and the structural modification includes a leucine-based motif, tyrosine-based
XX enhancing component which comprises a leucine-based motif, tyrosine-based
XX motif or an amino acid derivative. (I) is useful for treating a condition
XX such as neuromuscular disorder, autonomic disorder or pain, or spasmodic
XX dysphonia, laryngeal dystonia, oromandibular dysphonia, lingual dystonia,
XX cervical dystonia, focal hand dystonia, blepharospasm, strabismus,
XX hemifacial spasm, eyelid disorder, cerebral palsy, focal spasticity, tics,
XX spasmodic colitis, neurogenic bladder, anismus, limb spasticity, tics,
XX tremors, bruxism, anal fissure, achalasia, dysphagia, lacrimation,
XX hyperhidrosis, excessive salivation, excessive gastrointestinal
XX secretions, pain from muscle spasms, headache pain, brow furrows and skin
XX wrinkles. (I) is also useful for treating spinal curvature, various forms
XX of inflammatory pains, autonomic nervous system disorders, e.g., an
XX respiratory malfunctioning such as chronic obstructive pulmonary disease,
XX and asthma; pain not associated with a muscular disorder, such as spasm.
XX A unit amount of modified neurotoxin having altered biological activity
XX than natural neurotoxin, is more efficient to reduce exocytosis from a
XX cell than is a unit amount of naturally existing neurotoxin. This is the
XX amino acid sequence of a botulinum type toxin A light chain from which a
XX modified neurotoxin is created

SQ Sequence 437 AA;

ABU61544 Length: 437 August 31, 2004 14:39 Type: P Check: 6765
Found using 'seq23' (hayes346.key)

1 PFVNKQFNKDPVNGVDIAIKIPNVGQMQPVKAFKHNNKIWIPIERDTFTNPEEGDLNP
20 23

61 PPEAKQVPVSYYD

134 INVITPDGYSRSEBLNLIIGPSADIIQFCKSGFGEVLNLTNGYGSTQYIRSPDFTF
184

194 GFRESLEVDNPLLGAGKFAVDPAVTLAHLHAGHRLYGIATNPNRVKNTNAYVEMS
232 249

254 GLEVSFEELRTFGGHDAKFIDSLQENEFRLYYNKFQDKIASTLNKAISVGTASLQVMK
286

314 NVFKEKYLSDSTSGKFSVDKLFKDKMLTEIYTEDNFVKFFKVLNRYKTLNFDKAVF
341 365

CC hyperhydrosis, excessive salivation, excessive gastrointestinal
 CC secretions, pain from muscle spasms, headache pain, brow furrows and skin
 CC wrinkles. (I) is also useful for treating spinal curvature, various forms
 CC of inflammatory pains, autonomic nervous system disorders, e.g., an
 CC respiratory malfunctioning such as chronic obstructive pulmonary disease,
 CC and asthma; pain not associated with a muscular disorder, such as spasm.
 CC A unit amount of modified neurotoxin having altered biological activity
 CC than natural neurotoxin, is more efficient to reduce exocytosis from a
 CC cell than is a unit amount of naturally existing neurotoxin. This is the
 CC amino acid sequence of a botulinum type toxin B Danish I light chain used
 CC to determine a consensus sequence for Botulinum toxin
 XX
 SQ Sequence 441 AA;

ABU61545 Length: 441 August 31, 2004 14:39 Type: P Check: 9222 ..
 Found using 'seq23' (hayes346.key)

1 MPVTINNPNYNDPIDNNNIIMPEPPFARGTGKRYKAFKITDRWIIPERYTFGYKPEDFN
--
 33 36
 34 37

61 KSSGIFNRDVCEYDDPYLNTNDKKNI

...

149 ERKKGIFANLIIFGPGVLNENETIDIGIQNHFASREGFGGIMQMFCPEYVSFNNVQE
 |--|
 199

209 NKGASIFNRRGYFSDPALILMHLEIHLVHLGYIKVDLDLPVNPNEKFFMQSTDAIQAE

269 LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVRLNKLVCISDPNININIYKNKFKDKY
 |--|
 289
 328

329 KFVEDSEKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPYKIKNLLD
 |--|
 331
 349

389 NEIYTIIEGNISDKOMEKRYGQNKAINKQAYEEISKEHLAVYKIQMCKSVK
 |--|
 421

-- Search Statistics --

Times:		
CPU	00:00:00.05	Total Elapsed
		00:00:05.00

Number of sequences searched:	309
Number of sequence hits:	169
Number of separate matches:	1522
Number of sequence hits saved:	0


```

> O <
O | O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23sp" --

Selected search type is key against sequence data banks or files.
Selected scope is Sequence. "hayes346.key":
Selected sequence key from "seq23 AA preliminary pattern
1 seq23 (AA) ID: seq23 AA preliminary pattern
2 followed by
3 Y
4 any character
5 any character
6 1 or i or m or a or f or w or v or y

Selected files:

File : bt_sp.pep

-- Output Parameters --

Format Options:
Nucleic acid code matching Exact Indirect file
Find non-matching hits only No Sequence or key file
Report key used Yes List of hits
Note position of hit Yes Hit display
Display full annotations Yes Name and annotations
Sequence context 50

Run mode
Time to start comparison now
Notify at end of run No

-----
2 matches found in sequence:
arc3cbcp ; Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3
(from "bt_sp.pep")
TOIG of: arc3_cbcpc check: 5480 from: 1 to: 244

ID ARC3 CBCP STANDARD; PRT; 244 AA.
AC Q00901;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 30-MAY-2000 (Rel. 39, Last annotation update)
DE Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3).
OS Clostridium botulinum C bacteriophage.
OC Viruses.
OX NCBI_TaxID=12448;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 41-232.
RC STRAIN=003-9;
RX MEDLINE=92011724; PubMed=1918048;
RA Nemoto Y., Namba T., Kozaki S., Narumiya S.;
RT "Clostridium botulinum C3 ADP-ribosyltransferase gene. Cloning,
RT sequencing, and expression of a functional protein in Escherichia
RT coli.";
RL J. Biol. Chem. 266:19312-19319(1991).
RN [2]
RP SEQUENCE OF 41-59.
RC STRAIN=6813;
RX MEDLINE=92011359; PubMed=1917836;
RA Morishita K., Syuto B., Yokosawa N., Oguma K., Saito M.;
RT "Purification and characterization of ADP-ribosyltransferases
RT (exoenzyme C3) of Clostridium botulinum type C and D strains.";
RL J. Bacteriol. 173:6025-6029(1991).
RN [2]
RP FUNCTION: ADP-RIBOSYLATES EUKARYOTIC RHO AND RAC PROTEINS ON
CC

```

```

CC AN ASPARAGINE RESIDUE.
CC -!- SUBUNIT: Monomer.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- SIMILARITY: TO EXOENZYMES 3 OF C.LIMOSUM AND C.BOTULINUM D PHAGE,
CC AND TO S.AUREUS EDIN.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; M74038; AAA23212.1; --
CC PIR; A41021; A41021.
CC InterPro; IPR003540; Binary toxinA.
CC Pfam; PF03496; Binary_toxA; 1.
CC NAD; Transferase; Glycosyltransferase; Signal.
CC SIGNAL 1 40
CC CHAIN 41 244 MONO-ADP-RIBOSYLTRANSFERASE C3.
CC ACT SITE 213 213 BY SIMILARITY.
CC SEQUENCE 244 AA; 27358 MW; B78ESB1B9C16DF23 CRC64;
CC
CC ARC3 CBCP Length: 244 September 1, 2004 07:06 Type: P Check: 5480
CC Found using 'seq23' (hayes346.key)
CC
CC ...
13 LSAGVIAPVTTISVQSPQKCYACTVDKSGYADTFTEFTNVEAKKGNAGYKYLGLSKPE
63 66
73 QEAIKFYTRDASKINGPLRANQNGENCLPADILQKVLIQDSFS
...
120 MPQNIILFRGDDPAYLGPEFQDKILNKDGTINKTVFEQVKAFLKKDRTEYGYISLSMS
170
180 AQGGRRPIVTKFVTVNGSGGYIDIPISYPPGQLEVLPRNNSY
...
1 match found in sequence:
arc3C1o1m ; Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C
(from "bt_sp.pep")
TOIG of: arc3_c1o1m check: 3333 from: 1 to: 250
ID ARC3 C1O1M STANDARD; PRT; 250 AA.
AC Q46134;
DT 01-NOV-1997 (Rel. 35, Created)
DT 01-NOV-1997 (Rel. 35, Last sequence update)
DT 01-NOV-1997 (Rel. 35, Last annotation update)
DE Mono-ADP-ribosyltransferase C3 precursor (EC 2.4.2.-) (Exoenzyme C3).
GN C3.
OS Clostridium limosum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1536;
RN [1]
RP SEQUENCE FROM N.A., AND MUTAGENESIS.
RC STRAIN=2;
RX MEDLINE=96134846; PubMed=8555186;
RA Boehmer J., Jung M., Sehr P., Fritz G., Popoff M.R., Just I.,
RA Aktories K.;
RT "Active site mutation of the C3-like ADP-ribosyltransferase from
RT Clostridium limosum -- analysis of glutamic acid 174.";
RL Biochemistry 35:282-289(1996).
RN [2]
RP PARTIAL SEQUENCE.

```

```
RX MEDLINE=92268060; PubMed=1587816;
RA Just I., Mohr C., Schallehn G., Menard L., Didsbury J.R.,
RA Vandeckerckhove J., van Damme J., Aktories K.;
RT "Purification and characterization of an ADP-ribosyltransferase
RT produced by Clostridium limosum.";
RL J. Biol. Chem. 267:10274-10280(1992).
RN [3]
RN PARTIAL SEQUENCE.
RP MEDLINE=94043108; PubMed=8226842;
RX Jung M., Just I., van Damme J., Vandeckerckhove J., Aktories K.;
RA "NAD-binding site of the C3-like ADP-ribosyltransferase from
RT Clostridium limosum.";
RL J. Biol. Chem. 268:23215-23218(1993).
CC CC -|- FUNCTION: ADP-RIBOSYLATES EUKARYOTIC RHO AND RAC PROTEINS ON
CC AN ASPARAGINE RESIDUE.
CC CC -|- SUBUNIT: Monomer (By similarity).
CC CC -|- SUBCELLULAR LOCATION: Secreted.
CC CC -|- SIMILARITY: TO C.BOTULINUM D AND C PHAGES EXOENZYME C3, AND TO
CC S.AUREUS EDIN.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL: X87215; CAA60674.1; ..
DR InterPro: IPR003540; Binary toxinA.
DR Pfam: PF03496; Binary_toxA_1
KW NAD; Transferase; Glycosyltransferase; Signal.
FT SIGNAL 1 45
FT CHAIN 46 250
FT ACT SITE 219 219
FT MUTAGEN 219 219
FT E->D.Q: MAJOR DECREASE IN KCAT, BUT NO
FT MAJOR CHANGES IN KM.
SQ SEQUENCE 250 AA; 27852 MW; 7F351ADD0CE8DD8D CRC64;
ARC3 CLOIM Length: 250 September 1, 2004 07:06 Type: P Check: 3333
Found using 'seq23' (hayes346.key)
...
125 TPENILFRGDDEGYPGDPFENTILNRDGTINKAVPEQVKLRFGKDKRKEYGVISTLVN
175
185 GSAPAGRPITKFKVLDGSKAGVIEPISTFKGQLEVLPRSSVY
...
30 matches found in sequence:
bxa1c1ob0; Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
(TOIG from 'bxa1_sp.pep')
TOIG of: bxa1_c1ob0 check: 5280 from: 1 to: 1295
ID BXA1_C1OB0 STANDARD; PRT; 1295 AA.
AC P10845; P01561; P18639;
DT 01-JUL-1989 (Rel. 11, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (BoNT/A)
DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
DE chain; Botulinum neurotoxin A, heavy-chain].
GN BOTA OR BNA OR ATX.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
```

```
RC STRAIN=NCTC 2916;
RX MEDLINE=90235864; PubMed=2185020;
RA Thompson D.E., Brehm J.K., Oultram J.D., Swinfield T.-J.,
RA Shone C.C., Atkinson T., Melling J., Minton N.P.;
RT "The complete amino acid sequence of the Clostridium botulinum type A
RT neurotoxin, deduced by nucleotide sequence analysis of the encoding
RT gene.";
RL Eur. J. Biochem. 189:73-81(1990).
RN [2]
RN SEQUENCE FROM N.A.
RP STRAIN=62A;
RX MEDLINE=90264400; PubMed=2160960;
RA Binz B., Kuazono H., Wille M., Frevent J., Wernars K., Niewann H.;
RT "The complete sequence of botulinum neurotoxin type A and comparison
RT with other clostridial neurotoxins.";
RL J. Biol. Chem. 265:9153-9158(1990).
RN [3]
RN SEQUENCE OF 1-65 FROM N.A.
RP STRAIN=62A;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B, and F: evidence of chimeric sequences in the
RT gene encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RN [4]
RN SEQUENCE OF 1-34 FROM N.A.
RP STRAIN=Hall;
RX MEDLINE=89350959; PubMed=2669749;
RA Betley M.J., Somers E., Dasgupta B.R.;
RT "Characterization of botulinum type A neurotoxin gene: delineation of
RT the N-terminal encoding region.";
RL Biochem. Biophys. Res. Commun. 162:1388-1395(1989).
RN [5]
RN SEQUENCE OF 1-18 FROM N.A.
RP STRAIN=Type A NIH;
RX MEDLINE=96096783; PubMed=8521962;
RA Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RT components of Clostridium botulinum type A progenitor toxins.";
RL FEBS Lett. 376:41-44(1995).
RN [6]
RN SEQUENCE OF 1-16.
RP MEDLINE=84178501; PubMed=6370252;
RA Schmidt J.J., Sartymoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequence of the heavy and light chains of
RT botulinum neurotoxin type A.";
RL Biochem. Biophys. Res. Commun. 119:900-904(1984).
RN [7]
RN SEQUENCE OF 1-46.
RA Dasgupta B.R., Foley J., Niece R.;
RT "Partial sequence of the light chain of botulinum neurotoxin type A.";
RL Biochemistry 26:4162-4162(1987).
RN [8]
RN SEQUENCE OF 1-5 AND 444-456.
RX MEDLINE=91120847; PubMed=2126206;
RA Dasgupta B.R., Dekleva M.L.;
RT "Botulinum neurotoxin type A: sequence of amino acids at the
RT N-terminus and around the nicking site.";
RL Biochimie 72:661-664(1990).
RN [9]
RN SEQUENCE OF 448-464 AND 872-895.
RX MEDLINE=89024662; PubMed=3178218;
RA Sathymoorthy V., Dasgupta B.R., Foley J., Niece R.L.;
RT "Botulinum neurotoxin type A: cleavage of the heavy chain into two
RT halves and their partial sequences.";
RL Arch. Biochem. Biophys. 266:142-151(1988).
RN [10]
RN SEQUENCE OF 448-482.
RX MEDLINE=85285016; PubMed=3896784;
RA Shone C.C., Hambleton P., Melling J.;
RT "Inactivation of Clostridium botulinum type A neurotoxin by trypsin
```

and purification of two tryptic fragments. Proteolytic action near the COOH-terminus of the heavy subunit destroys toxin-binding activity.";
 Eur. J. Biochem. 151:75-82 (1985).
 [11]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94063091; PubMed=8243676;
 RA Schiavo G., Santucci A., Dasgupta B.R., Mehta P.P., Jontes J., Benfenati F., Wilson M.C., Montecucco C.;
 RT "Botulinum neurotoxins serotypes A and E cleave SNAP-25 at distinct COOH-terminal peptide bonds.";
 RL FEBS Lett. 335:99-103 (1993).
 RN [12]
 RP IDENTIFICATION OF SUBSTRATE.
 RX MEDLINE=94124495; PubMed=8294407;
 RA Binz T., Blas J., Yamasaki S., Baumeister A., Link E., Suedhof T.C., Jahn R., Niemann H.;
 RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
 RL J. Biol. Chem. 269:1617-1620 (1994).
 RN [13]
 RP MUTAGENESIS OF GLU-261; PHE-265 AND TYR-365.
 RX MEDLINE=21556941; PubMed=11700044;
 RA Rigoni M., Caccin P., Johnson E.A., Montecucco C., Rossetto O.;
 RT "Site-directed mutagenesis identifies active-site residues of the light chain of botulinum neurotoxin type a.";
 RL Biochem. Biophys. Res. Commun. 288:1231-1237 (2001).
 RN [14]
 RP X-RAY CRYSTALLOGRAPHY (3.3 ANGSTROMS).
 RX MEDLINE=98455071; PubMed=9783750;
 RA Lacy D.B., Tepp W., Cohen A.C., Dasgupta B.R., Stevens R.C.;
 RT "Crystal structure of botulinum neurotoxin type A and implications for toxicity.";
 RL Nat. Struct. Biol. 5:898-902 (1998).
 CC -!- FUNCTION: Inhibits acetylcholine release. The botulinum toxin binds with high affinity to peripheral neuronal presynaptic membrane, is then internalized by receptor-mediated endocytosis. The C-terminus of the heavy chain (H) is responsible for the adherence of the toxin to the cell surface while the N-terminus mediates transport of the light chain from the endocytic vesicle to the cytosol. After translocation, the light chain (L) hydrolyzes the 197-Gln-|-Asp-198 bond in SNAP-25, thereby blocking neurotransmitter release. Inhibition of acetylcholine release results in flaccid paralysis, with frequent heart or respiratory failure.
 CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No detected action on small molecule substrates.
 CC -!- COFACTOR: Binds 1 zinc ion per subunit.
 CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a heavy chain (H).
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- PHARMACEUTICAL: Available under the name BOTOX (Allergan) for the treatment of strabismus and blepharospasm associated with dystonia and cervical dystonia. Also used for the treatment of hemifacial spasm and a number of other neurological disorders characterized by abnormal muscle contraction.
 CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
 CC -!- SIMILARITY: Belongs to peptidase family M27.
 CC -!- DATABASE: NAME=BOTOX product information web site;
 CC WWW="http://www.botox.com/index.jsp?hp&productinfo".
 CC -!- DATABASE: NAME=Protein Spotlight;
 CC NOTE=Issue 19 of February 2002;
 CC WWW="http://www.expasy.org/spotlight/articles/sptlt019.html".

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DR EMBL; X52066; CAA36289.1; -;
 DR EMBL; M30196; AAA23262.1; -;
 DR EMBL; X92973; CAA63551.1; -;
 DR EMBL; D67030; BAA11051.1; -;
 DR EMBL; M27892; AAA23269.1; -;
 DR PIR; A35294; BTCLAB.
 DR PDB; 3BTA; 01-OCT-99.
 DR MEROPS; M27.002; -;
 DR InterPro; IPR008985; ConA like lec.gl.
 DR InterPro; IPR002160; Kunitz legume.
 DR InterPro; IPR006025; Pept_M_Zn_BS.
 DR InterPro; IPR000395; Peptidase_M27.
 DR Pfam; PF01742; Peptidase_M27; 1.
 DR PRINTS; PR00760; BONTOKILYSIN.
 DR ProDom; PD001963; Bontokilysin; 1.
 DR PROSITE; PS00142; ZINC_PROTEASE; 1.
 KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
 KW Pharmaceutical; 3D-structure.
 FT INIT_MET 0
 FT CHAIN 1 447
 FT CHAIN 448 1295
 FT METAL 222 222
 FT ACT_SITE 223 223
 FT METAL 226 226
 FT METAL 261 261
 FT DISULFID 429 453
 FT DISULFID 1234 1279
 FT TRANSMEM 626 646
 FT TRANSMEM 655 675
 FT VARIANT 26 26
 FT MUTAGEN 261 261
 FT MUTAGEN 265 265
 FT MUTAGEN 365 365
 FT CONFLICT 1 1
 FT CONFLICT 479 479
 FT CONFLICT 875 875
 FT CONFLICT 891 891
 SQ SEQUENCE 1295 AA; 149322 MW; 858342F754862579 CRC64;
 BXAL CLOBO Length: 1295 September 1, 2004 07:06 Type: P Check: 5280
 Found using 'seq23' (hayes346.key)
 1 PFVNKQFNKDPVNGVDIAYIKIPNVGQMPVKAFKHKNKIWIPIERDTFTNPEGLNP 20 23
 61 PPEAKQVPVSYD
 ...
 134 INVIPDGSVRSEELNLVIIGPSADIIQFECKSFGEVNLNTRNGYGSTQYIRFSPDFTF 184
 194 GFESLEVDNPLLGAGKEATDPAVTLAHELHAGHRLYGIAINPNRPFKVTNAYEMS 232
 254 GLEVSFEELRTFGHDAKFDLSQENEFELYYNFKFKDTASTINKAKSIGVTASLQYMK 249
 314 NVFKEKLLSEDTSCFKSVDKLKFVKLXMLEIYTEDNFVFKFKVLNKRKTLNFKDAVF 341
 374 KINIVPKNYNTIYDGFNLNRLNTLANFNGQNTENNMMFTKLNFTGLFVKYKLCVIRGI 383
 386

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434  ITSSTKSLDKYKALNDLCLIKVNNWDLFFSPSEDNFTDNLKGEITSDTNTIEAEEI
      445
494  SLDLIQOYVLTFFDNEPENISLSSDIIGQLELMPNIEFPNGKKYELDKYTMFHYL
      502
554  -| RAOFEHGKSRIALTNSVEALLNPSRVYTFPSSDYVKVKVKNKATEAAMFLGWBLVYDF
      555
614  TDETSEVSTTDKIADITIIIPY
...
659  GAVILLEFIPBIAIPVLGTFAVSYIANKVLTVQTDNALSKRNEKWDVYKIVTNWLA
      709
719  KVNTQIDLRKKMKEALENQAEATKAIINYQVNOYTEBEKNNINFNIDLSSKLNESINK
      750
779  AMININKEFNQCSVYLMNSMIPYG
...
883  ESNHLIDLRYASKINIGSKVNFDPIDKNQIQLFNLESSKIEVLKNAIVNYSMEFST
      933
943  SFWRIPKVFNSISLNNEVTTINCMMENNSGKVSILNYGELIWTLODTQBIKQVVVFYSQ
      961
1003  MINISDYINRWIFVTITNRLNLSKIYINGRLIDQKPISNLGNHHSNNIMFKLDCRDT
      1003
1063  HRYIWKYFNFLDKELNEKEIKDLYDNQNSGILKDFWGDYQYDKPYVYMLNLYDNKVY
      1065
1123  DVNNVGIRGYMYLKGPRGSVMTTNIYLSYRGTKFIKKVASGNKDNIVRNNDVYIN
      1124
1183  VVVKNEYRLATNASQAGVEKILSALSIIDPVGNLSQVVVMKSKNDQGITNKKCRNQLQDNN
      1183
1243  G
...
29 matches found in sequence:
bxa2c1obo ; Botulinum neurotoxin type A precursor (EC 3.4.24.69) (Bont/A)
(from "bt.sp.pep")
TOIG of: bxa2_c1obo check: 706 from: 1 to: 1295
PRT: 1295 AA.
ID BXA2_C1OBO STANDARD;
AC Q45894; P77780;
DT 28-FEB-2003 (Rel. 41, Created)
DT 28-FEB-2003 (Rel. 41, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type A precursor (EC 3.4.24.69) (Bont/A)
DE (Bontoxilysin A) (BOTOX) [Contains: Botulinum neurotoxin A, light-
DE chain; Botulinum neurotoxin A, heavy-chain].
DE BOTA OR ENA OR ATX.

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OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kyoto-F;
RX MEDLINE=94143603; PubMed=8310180;
RA Willem A., East A.K., Lawson P.A., Collins M.D.;
RT "Sequence of the gene coding for the neurotoxin of Clostridium
RT botulinum type A associated with infant botulism: comparison with
RT other clostridial neurotoxins.";
RL Res. Microbiol. 144:547-556(1993).
RL [2]
RP SEQUENCE OF 1-65 FROM N.A.
RC STRAIN=Kyoto-F;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B, and F: evidence of chimeric sequences in the
RT gene encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
RL [-] FUNCTION: Inhibits acetylcholine release. The botulinum toxin
CC binds with high affinity to peripheral neuronal presynaptic
CC membrane, is then internalized by receptor-mediated endocytosis.
CC The C-terminus of the heavy chain (H) is responsible for the
CC adherence of the toxin to the cell surface while the N-terminus
CC mediates transport of the light chain from the endocytic vesicle
CC to the cytosol. After translocation, the light chain (L)
CC hydrolyzes the 197-Gln-|-Arg-198 bond in SNAP-25, thereby blocking
CC neurotransmitter release. Inhibition of acetylcholine release
CC results in flaccid paralysis, with frequent heart or respiratory
CC failure (By similarity).
CC [-] CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC [-] SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H) (By similarity).
CC [-] SUBCELLULAR LOCATION: Secreted.
CC [-] MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C, D, E, F, and G.
CC [-] SIMILARITY: Belongs to peptidase family M27.
CC
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CC
CC -----
CC EMBL; X73423; CAA51824.1; -
CC EMBL; X87974; CAA61234.1; -
CC FIR; 140645; I40645.
CC HSSP; P10845; 3BTA.
CC MEROPS; M27.002; -.
CC InterPro; IPR008985; ConA like lec gl.
CC InterPro; IPR002160; Kunitz legume.
CC InterPro; IPR006025; Pept M.Zn.BS.
CC InterPro; IPR000395; Peptidase M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; Bontoxilysin; 1.
CC ProDom; PD001963; Bontoxilysin; 1.
CC PROSITE; PS00142; ZINC PROTEASE; FALSE NEG.
CC Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
CC INIT MET 0 0
CC CHAIN 1 447 BOTULINUM NEUROTOXIN A, LIGHT-CHAIN.
CC CHAIN 448 1295 BOTULINUM NEUROTOXIN A, HEAVY-CHAIN.
CC METAL 222 222 ZINC (CATALYTIC) (BY SIMILARITY).
CC ACT SITE 223 223 BY SIMILARITY.
CC METAL 226 226 ZINC (CATALYTIC) (BY SIMILARITY).
CC DISULFID 429 453 INTERCHAIN (BY SIMILARITY).

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FT DISULFID 1234 1279 BY SIMILARITY.
FT TRANSMEM 626 646 POTENTIAL.
FT TRANSMEM 655 675 POTENTIAL.
SQ SEQUENCE 1295 AA; 149279 MW; 5DA04A13D98D6372 CRC64;
BXA2 CLOBO Length: 1295 September 1, 2004 07:06 Type: P Check: 706
Found using 'seq23' (hayes346.key)

1 PFVNKQFNKDPVNGVDIAYIKIPNAGQMPVKAFLHNKIWIPIERDTFTNPERGDLNP
20 23
61 PPEAKQVPVSYD
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134 INVLPDGSYSEELNLVIGPSADIIQFECKSFCHDVNLNTRNGYGSTQYIRFSPDFTF
184
194 GFERSLEVDTNPLLGAGKFAFDPAVTLAHELIIHAHRLYGLAIINPNRVFKVNTNAYVEMS
232
254 GLEVSFELRTFGHDAKFIDSLQENBFRILYNNKFKDVASTLNKAKSIIGTTASLQVMK
286
314 NVFKEKLLSDDTSKGFSVDKLFKDKLYKMLTEIYTDNFVNPFKVINRKYTLNFDKAVF
341
374 RINIVPDENVTIKDGPNLKGANLSTNFNGQNTNINSRNFTLNKFTGLFFYKLLCVRGI
425
434 IPFKTKSLDGYKALNDLCIKVNNWDLFFSPSEDNFTNLDKVEITADTNTAEAEENI
445
494 SLDLIQQVYLTDFDNEPENISINENSSDIIGLEPNPIERFPNGKKYBLDYTMPHYL
502
554 RAQEFPHGDSRIILTNSABEALLKPNVAYTFFSSKYVKKINKAVEAFMFLNWAELVYDF
582
614 TDENETVTMDKIADITIIVPY
...
700 KRNEKWDEVKYVTVNLAKVNTQIDLIBKMKALENOAEATKALINYQNYTBEERN
750
760 NINFNIDLLSSKLNESINSAMININKFLDQCSVSLNMGMPYA
...
855 YVDNKKLLSTFTTEYIKNIVNTSILSIVYKKDDLDLISRYGAKINIGDRVYVYDSIDKNQIK
905
915 LINLESSTIEVLKNAIVNSMYENFSTFWIKPKYFSKINLNNEYTTIENNSGWMK
933
975 VSLNAGEIILWTLODNKQNIQRFVFKYSQWNSIDVINRWIFVTITNRLTKSKIYINGEL
979
1000
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1035 IDQKPIISNLGNIHASNKIMFKLDGCRDPRRYIMIKYENLFDKELNEKEIKDLYDSOSNSG
1065 1070
1095 ILKDFWGNLYQDKPYMYMLNLFDPNKYVDVNNIGIRGYMYLKGPRGSVVTTNIIYNSTLY
1103 1110 1121 1132
1155 EGTKFIKKYASGNEEDNIVRNDRVYINVVKNKEYRLATNASQAGVEKILSALEIPDVG
1180 1190
1215 NLSQVVVMKSKDDQIRNCKMNLQDNNGNDIGFIFGLHYDNIKIAKLVASNWNVRQVGKAS
1254
1275 RTFGCSWEFIPVDDGWGESSL
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26 matches found in sequence:
bxbclobo ; Botulinum neurotoxin type B precursor (EC 3.4.24.69) (BoNT/B)
(from "bt sp pep")

TOIG of: bxb_clobo check: 5052 from: 1 to: 1290

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ID BXB CLOBO STANDARD; PRT; 1290 AA.
AC P10844; P10843;
DT 01-JUL-1989 (Rel. 11, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Botulinum neurotoxin type B precursor (EC 3.4.24.69) (BoNT/B)
DE (Bontoxilysin B).
GN BOTB.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=92384550; PubMed=1514783;
RA Whelan S.M., Elmore M.J., Bodsworth N.J., Brehm J.K., Atkinson T.,
RA Minton N.P.;
RT "Molecular cloning of the Clostridium botulinum structural gene
RT encoding the type B neurotoxin and determination of its entire
RT nucleotide sequence.";
RL Appl. Environ. Microbiol. 58:2345-2354(1992).
RN [2]
RP SEQUENCE OF 35-245 FROM N.A.
RC STRAIN=NCTC 7273;
RA Szabo E.A., Pemberton J.M., Desmarchelier P.M.;
RL Submitted (APR-1992) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE OF 633-993 FROM N.A.
RC STRAIN=NCTC 7273;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulinum neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
RN [4]
RP SEQUENCE OF 1-44 AND 441-466.
RC STRAIN=657;
RX MEDLINE=89000987; PubMed=3139097;
RA Dasgupta B.R., Datta A.;
RT "Botulinum neurotoxin type B (strain 657): partial sequence and
RT similarity with tetanus toxin.";
RL Biochimie 70:811-817(1988).
RN [5]
RP SEQUENCE OF 1-16 AND 441-458.
RC STRAIN=OKRA;
RX MEDLINE=85197963; PubMed=3888113;
RA Schmidt J.J., Sathymoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequences of botulinum neurotoxins types B and
```

RT E."; Biochem. Biophys. 238:544-548(1985).
RL Arch. [6]
RN IDENTIFICATION AS ZINC-PROTEASE.
RX MEDLINE=93054694; PubMed=1429690;
RA Schiavo G., Rossetto O., Santucci A., Dasgupta B.R., Montecucco C.;
RT "Botulinum neurotoxins are zinc proteins.";
J. Biol. Chem. 267:23479-23483(1992).
RN [7]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=93063293; PubMed=1331807;
RA Schiavo G., Benfenati F., Poulain B., Rossetto O., de Laureto P.P.,
RT Dasgupta B.R., Montecucco C.;
RN "Tetanus and botulinum-B neurotoxins block neurotransmitter release
by proteolytic cleavage of synaptobrevin.";
Nature 359:832-835(1992).
CC -1- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
ENDOPEPTIDASE THAT CLEAVES THE 76-GLN-|-PHE-77 BOND OF
SYNAPTOSOMAL-2.
CC -1- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
detected action on small molecule substrates.
CC -1- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -1- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
heavy chain (H). The light chain has the pharmacological activity,
while the N- and C-terminal of the heavy chain mediate channel
formation and toxin binding, respectively.
CC -1- SUBCELLULAR LOCATION: Secreted.
CC -1- MISCELLANEOUS: There are seven antigenically distinct forms of
botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -1- SIMILARITY: Belongs to peptidase family M27.

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DR EMBL; M81186; AAA23211.1; -;
DR EMBL; Z11934; CAA77991.1; -;
DR EMBL; X70817; CAA50148.1; -;
DR PIR; A48940; A48940.
DR PDB; 1EFW; 01-NOV-00.
DR PDB; 1F31; 01-NOV-00.
DR PDB; 1F82; 16-AUG-00.
DR PDB; 1F83; 16-AUG-00.
DR PDB; 1FOH; 06-DEC-00.
DR PDB; 1G9A; 13-NOV-02.
DR PDB; 1G9B; 13-NOV-02.
DR PDB; 1G9C; 13-NOV-02.
DR PDB; 1G9D; 13-NOV-02.
DR PDB; 111E; 21-NOV-01.
DR MEROPS; M27.002; -;
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PD00760; BONTOTOXILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc;
3D-structure.
KW INIT MET 0
FT CHAIN 1 440 BOTULINUM NEUROTOXIN B, LIGHT-CHAIN.
FT CHAIN 441 1290 BOTULINUM NEUROTOXIN B, HEAVY-CHAIN.
FT METAL 229 229 ZINC (CATALYTIC) (BY SIMILARITY).

FT ACT SITE 230 230 BY SIMILARITY.
FT METAL 233 233 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 436 445 INTERCHAIN (PROBABLE).
FT CONFLICT 29 29 T -> M (IN REF. 4).
FT CONFLICT 217 217 R -> G (IN REF. 2).
FT CONFLICT 224 224 A -> S (IN REF. 2).
FT CONFLICT 463 463 S -> R (IN REF. 4).
SQ SEQUENCE 1290 AA; 150670 MW; D21746B2C02ADF43 CRC64;
BXB_CLOBO Length: 1290 September 1, 2004 07:06 Type: P Check: 5052
Found using 'seq23' (hayes346.key);
1 PVTINNPNYNDPNDNNIIMWEPFARGTGRTYKAFKITDRWIIPRYTGYKPEDFNK
32 35
33 36
61 SSGIFNRDVCYEDPDYLTNDKKN
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148 ERKKGIFANLIIFGPGVNLNETIDIGIQNHFASREGFGGIMQMCKPCYVSVFNNVOE
198
208 NKGASIFNRGYSPPALLMLHGLHVLHGLYGIKVDLDPIVPNEKKFFMOSTDAIQABE
268 LYTFGGQDPSIITPSTDKSIYDKVLQNGRIVDRNLKVLVCISDPNINITYKKNFKDKY
288
328 KEVDESECKYSIDVESPDKLYKLMFGFTETNAENYKIKTRASYFSDSLPVPVKIKNLLD
330
388 NEIYTIIEGFNISDKMEYRGQNKANKQAYEISKEHLAVYKIOMCKSVKAFGICID
420
448 VDNEDLFTIADKNFSDDLKSKNERIE
...
519 VYEKQPAIKKIFTDENTIFQYLYSQTFPLDIRDISLUTSSFDALLFSNKVYFFSMDYIK
569
579 TANKVVEAGLFAGWKQIVNDFVIEANKSNTMDKIADISLIVPYIGLALNVGNETAKGNF
622
639 ENAFEIAGASILLEFIPELLIPVVGAFLLSEYIDNKNKIKTIDNALTKRNEKWSDMYGL
696
699 IVAOWLSTVNTQFYTIKEGMYKALNYQAQALEEIIKYRNIYSEKESKNINIDFNDSK
719
759 LNEGNOADINNNFNGCSVLYMKMKMPLA
...
837 FDLISYNTDILLIEMFNKYNSEILNNILNRYKDNLLIDLSGVGAKVEYVDGVELNDKN
887
897 QFKLTSSANSKIRVTQNQNIIFNSVFLDFSFWIRIPKYKNDGIONYIHNEYITINCMK
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957 NNSGWKISIRGNRIIWTLLIDINGKTSVFFEYNIREDISEYINRWF

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1127  NQNSKYINRYDLYIGEFIIIRKNSQSINDDIVRKEDYLYLDFNLLNQEWVYTYKFK
      |---|
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      1135
      1165
      1167
1187  KEBEKLFLAPISDSDEFYNTIQIKEYDEQPTYSQQLLFKKDEESTDEIGLIGIHRFVESG
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1247  IVPEYKDYFCISKWYLKVKRKYFNKLGCNQWQIFPKDEGWTE
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      1252
      1255

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30 matches found in sequence:
bxc1clobo ; Botulinum neurotoxin type C1 precursor (EC 3.4.24.69) (BoNT/C1)
(from "bt sp.pep")
TOIG of: bxc1_clobo check: 7991 from: 1 to: 1290

ID BXC1_CLOBO STANDARD; PRT; 1290 AA.
AC Fl640;
DT 01-NOV-1990 (Rel. 16, Created)
DT 01-NOV-1990 (Rel. 16, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type C1 precursor (EC 3.4.24.69) (BoNT/C1)
DE (Bontoxilysin Cl).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RX MEDLINE=90370487; PubMed=2204031;
RA Hauser D., Eklund M.W., Kurazona H., Binz T., Niemann H., Gill D.M.,
RA Boquet P., Popoff M.R.;
RT "Nucleotide sequence of Clostridium botulinum C1 neurotoxin.";
RL Nucleic Acids Res. 18:4924-4924(1990).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=91024998; PubMed=2222445;
RA Kimura K., Fujii N., Tsuzuki K., Murakami T., Indoh T.,
RA Yokosawa N., Takeshi K., Syuto B., Oguma K.;
RT "The complete nucleotide sequence of the gene coding for botulinum
RT type C1 toxin in the C-ST phage genome.";
RL Biochem. Biophys. Res. Commun. 171:1304-1311(1990).
RN [3]
RP SEQUENCE OF 2-25.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=88153072; PubMed=2450068;
RA Tsuzuki K., Yokosawa N., Syuto B., Ohishi I., Fujii N., Kimura K.,
RA Oguma K.;
RT "Establishment of a monoclonal antibody recognizing an antigenic site
RT common to Clostridium botulinum type B, C1, D, and E toxins and
RT tetanus toxin.";
RL Infect. Immun. 56:898-902(1988).
RN [4]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94038966; PubMed=7901002;

```

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RA Blasi J., Chapman E.R., Yamasaki S., Binz T., Niemann H., Jahn R.;
RT "Botulinum neurotoxin C1 blocks neurotransmitter release by means of
RT cleaving HPC-1/syntaxin.";
RL EMBO J. 12:4821-4828(1993).
CC -1- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CLEAVES SYNTAXIN.
CC -1- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -1- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -1- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel
CC formation and toxin binding, respectively.
CC -1- SUBCELLULAR LOCATION: Secreted.
CC -1- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -1- MISCELLANEOUS: BOTULINUM TYPE C1 NEUROTOXIN IS SYNTHESIZED BY C
CC STRAIN OF CLOSTRIDIUM BOTULINUM WHICH CARRY THE APPROPRIATE
CC BACTERIOPHAGE.
CC -1- SIMILARITY: Belongs to peptidase family M27.
CC
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CC
CC EMBL; X66433; CAA47060.1; -
CC EMBL; X72793; CAA51313.1; -
CC EMBL; X53751; CAA37780.1; -
CC EMBL; D90210; BAA14235.1; -
CC EMBL; X62389; CAA44263.1; -
CC HSSP; P10845; 3BTA.
CC MEROPS; M27.002; -.
CC InterPro; IPR008985; ConA like lec_gl.
CC InterPro; IPR002160; Kunitz legume.
CC InterPro; IPR006025; Pept M.Zn.BS.
CC InterPro; IPR000395; Peptidase M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; BONTOXILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT INIT MET 0 0
FT CHAIN 1 448 BOTULINUM NEUROTOXIN C1, LIGHT-CHAIN.
FT CHAIN 449 1290 BOTULINUM NEUROTOXIN C1, HEAVY-CHAIN.
FT METAL 228 228 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 229 229 BY SIMILARITY.
FT METAL 232 232 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 436 452 INTERCHAIN (PROBABLE).
FT CONFLICT 84 84 P -> T (IN REF. 2).
SQ SEQUENCE 1290 AA; 148734 MW; 71FBE379F97129E8 CRC64;

BXC1_CLOBO Length: 1290 September 1, 2004 07:06 Type: P Check: 7991
Found using 'seq23' (hayes346.key)
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151 INPSVIITGPENIIDPTSTPKLTNNTPAAQEGFALSIIISPRFMLTYSGNATNDVGE
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211 GRFSKSEFCMDPILIMHNLNHNHNLGIALPNDQTISSVTSNIFYSQYNKLVAEIY
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271 AFGPTIDLLPKSARKYFEKALDYVESIAKRLNSITITANPSSFNKYGVEYKQKILRKYR 329
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-| 331 FVYESSGEVTVNRNKFVELYNELTQIFTEFNAYAKIYVNVQNRKIYLSNVYTFVTANILDDN 379
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391 VYDIQGNFIPKSNLNLVLFMGQNLNRNPALRKVPENMLYLF
...
465 IGDLSVKTDIFLRKQDINEETEVIIYYPDNVSDQVILSKNTSEHGQLDLLYPSDSRSEI 515
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525 LPGAQVFDYDNRQNDYLSYVLESQKLSNDNVEDEFTFTRSEALDNSAKVYTFYFTL 578
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      546
585 ANKVNAGVQGLFLMWANDVVEDEFTTILRLKDTLDKIDSVSAIIPYIGPALNISVVRG
645 NFEAFVAVGTVILLEAPPEFTIPALGAFVITYSKVQERNEIITKIDNCLQRIKRWKDSY 704
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      676
705 EWMGTWLSRIITQFNISQYMSYSLNVAQAGAIKADIDLEKYSKSGSDKENIKSQVENLK 745
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765 NSLDVKISEAMNNINKFIRECSVYLFKMWLPKV
...
880 NTLVDTSGYNAEVSEEGVQLNPFPDFKLGSSGEDRGKVIIVTQNMNVNMSYESFSI 930
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940 SFWRINKWVNLPGYTIIDSVKNNSGWSIGIISNLFVTLKQNEDSBQSINFSYDISNN 955
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1000 APGVNKNFVTVTNMNMGNKIYINGKLIDTIKVKELTGINFSTKITFEINKIPDTGLIT 1003
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1060 SDSDNINWIRDYIFAKELDGKDINILFNSLOYTVNVKDYWGNDLRVYKYYMNDYL 1111
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1120 NRYMYANSQIVFNTNRNNDNENEGYKIIKIRIGNTNDRVRGGDILYFDMTINNKA 1178
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      1145
1180 LFMKNETWYADNHSTEDIYALGREQTKDINDNIIIFIQPMNNTYYASQIFKSNFNGN 1224
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      1181
1240 ISGICSGTYRFRLGDDYRHNLYVTVKQGNVYASLLESTSTHWGFPVSE 1272
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      1272
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24 matches found in sequence:
bxcn_clobo ; Botulinum neurotoxin type C1, nontoxic component.
(from "bt_sp.pep")
TOIG of: bxcn_clobo check: 1182 from: 1 to: 1196
ID BXCN_CLOBO STANDARD; PRT; 1196 AA.
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AC P46081;
DT 01-NOV-1995 (Rel. 32, Last Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type C1, nontoxic component.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type C Stockholm / C-ST;
RX MEDLINE=3221894; PubMed=1567404;
RA Tsuzuki K., Kimura K., Fujii N., Yokosawa N., Oguma K.;
RT "The complete nucleotide sequence of the gene coding for the
nontoxic-nonhemagglutinin component of Clostridium botulinum type C
progenitor toxin.";
RL Biochem. Biophys. Res. Commun. 183:1273-1279(1992).
CC -!- FUNCTION: THE NONTXIC COMPONENT IS NECESSARY TO MAINTAIN
TOXICITY.
-----
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or send an email to license@isb-sib.ch).
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CC EMBL; X62389; CA44262.1;
CC InterPro; IPR008985; ConA like lec.gl.
CC InterPro; IPR000395; Peptidase M27.
CC Pfam; PF01742; Peptidase M27; 1.
CC PRINTS; PR00760; BONTOKILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC Neurotoxin.
CC KW Neurotoxin.
CC SQ SEQUENCE 1196 AA; 138740 MW; 4BD5956274D7F9C3 CRC64;
BXCN_CLOBO Length: 1196 September 1, 2004 07:06 Type: P Check: 1182
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120 PNIFFGTGTPSKNKLNSLVSTIPFPFGGYRETHYIESQNNKNFYASNIIFGPGSNIV
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      211
180 ENNVYIYKKNDANGMGMTMAEIVFQPLLTYKYNKFYIDPAMELTCLIKSLYFLYGIKPS 231
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240 DNLVVPYRLRTELDNKPFSQLNIIDLLISGGVDLEFINTNPFWTNTPNSFPNSIKMFEKVK 298
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300 NIYKTEIEGNAIGNDIKRLKQKQFQINVQDIWNLNLNYFCQSFNSIIPDRFSNALKHFY 301
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360 RKQYTYTMDYTDNYNINGFVNGQINTKLPLSNKNNTNIIISKPEKVNVLNENNISLMKSNY 363
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420 GDGLKGTTEDFYSTYKIPYNEEYEFNFDSNFPPLNNISIEEVDISIPEIIDINPYKDNSD 431
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      431
480 NLVFTQITSGMTEVTTHTALSINYLQAIQTNNENFTLSSDFSKVSSKDKSLVYSPDLNL 503
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540 MSYLETIKNGPIDTDKXYLYMLKEVFNKYNFDFINLTAQEIDSMCGINEVVLWFGKALNIL
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      677
      680
720 KLIRETTEKTFIDLSNESQISQSMNRVDNPLNKASICVFVEDIYKPKFISYMEKYINNINIKT
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780 REFQIQRCTNINDNEKSILINSYTFKTIIDFKFLDIQSIKNFFNSQVQMKELISPYQLLL
      835
840 FASKGPNLSIEDISGKNTLIQYTESIELVYGVNGESLYLKSPNETIKF
...
914 DDKTRLIGNKVNKGWEYFEDNGLVFEIIDSNGQESVYLSNIINDWYVYISVDRLK
      964
974 DQLLIFINDKNVANVSIDQILSIYXTNLIISLVNKNNSIYVEELSVLDNPITSEEVIRNYF
      1032
- SYLNSYIRDSSKSLLEYNKYNQIYNYVFPETSLYEVNDNKNYSLSKNTDGINISSVKF
1034 1035 1055 1077
- SYLNSYIRDSSKSLLEYNKYNQIYNYVFPETSLYEVNDNKNYSLSKNTDGINISSVKF
1034 1035 1055 1077
1094 KLINIDSKYVQKWDCEIICVLDTGTEKYLIDISPENNRIQLVSSKDNNAKKTIVNTDLFRP
      1122
1154 DCITFSYNDKYFESLRLDGDYNNWMCNDNKNKVPKGAHLWILES
      1164 1174
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25 matches found in sequence:
bxdclobo ; Botulinum neurotoxin type D precursor (EC 3.4.24.69) (BONT/D)
(from "bt.sp.pep")
TOIG of: bxdclobo check: 326 from: 1 to: 1276
ID BXD_CLOBO STANDARD; PRT; 1276 AA.
AC P19321;
DT 01-NOV-1990 (Rel. 16, Created)
DT 01-NOV-1990 (Rel. 16, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type D precursor (EC 3.4.24.69) (BONT/D)
DE (Bontoxilysin D).
GN BOTD.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RC SEQUENCE FROM N.A.
RC STRAIN=BVD/-3;
RX MEDLINE=91016853; PubMed=2216736;
RA Binz T., Kurazono H., Popoff M.R., Eklund M.W., Sakaguchi G.,

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RA Kozaki S., Kriegelstein K., Henschen A., Gill D.M., Niemann H.;
RT "Nucleotide sequence of the gene encoding Clostridium botulinum
RL neurotoxin type D.";
RL Nucleic Acids Res. 18:5556-5556(1990).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=CB16;
RX MEDLINE=93042276; PubMed=1420572;
RA Sunagawa H., Ohnaya T., Watanabe T., Inoue K.;
RT "The complete amino acid sequence of the Clostridium botulinum type D
RT neurotoxin, deduced by nucleotide sequence analysis of the encoding
RT phage d-16 phi genome.";
RT J. Vet. Med. Sci. 54:905-913(1992).
RN [3]
RP PARTIAL SEQUENCE.
RC STRAIN=D-SA, and D-1873;
RX MEDLINE=89393741; PubMed=2668193;
RA Moriishi K., Syuto B., Kubo S., Oguma K.;
RT "Molecular diversity of neurotoxins from Clostridium botulinum type D
RT strains.";
RT Infect. Immun. 57:2886-2891(1989).
RN [4]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94230352; PubMed=8175689;
RA Yamasaki S., Baumeister A., Binz T., Biasi J., Link E., Cornille F.,
RA Roques B., Fykse E.M., Suedhof T.C., Jahn R., Niemann H.;
RT "Cleavage of members of the synaptobrevin/VAMP family by types D and
RT F botulinum neurotoxins and tetanus toxin.";
RL J. Biol. Chem. 269:12764-12772(1994).
CC -1- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CLEAVES THE 60-LYS-|LEU-61 BOND OF
CC SYNAPTOSOMES-1 AND -2.
CC -1- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -1- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -1- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel
CC formation and toxin binding, respectively.
CC -1- SUBCELLULAR LOCATION: Secreted.
CC -1- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -1- MISCELLANEOUS: BOTULINUM TYPE D NEUROTOXIN IS SYNTHESIZED BY D
CC STRAIN OF CLOSTRIDIUM BOTULINUM WHICH CARRY THE APPROPRIATE
CC BACTERIOPHAGE.
CC -1- SIMILARITY: Belongs to peptidase family M27.
-----
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EMBL; X54254; CAA38175.1; -.
EMBL; S49407; AAB24244.1; -.
PIR; S11455; S11455.
HSSP; P10845; 3BTA.
MEROPS; M27.002; -.
InterPro; IPR008985; ConA_like_lec_gl.
InterPro; IPR002160; Kunitz_legume.
InterPro; IPR006025; Pept_M_Zn_BS.
InterPro; IPR000395; Peptidase_M27.
Pfam; PF01742; Peptidase_M27; 1.
PRINTS; PR00760; BONTOKILYSIN.
ProDom; PD001963; Bontoxilysin; 1.
PROSITE; PS00142; ZINC_PROTEASE; 1.

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KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT CHAIN 1 442 BOTULINUM NEUROTOXIN D, LIGHT-CHAIN.
FT CHAIN 443 1276 BOTULINUM NEUROTOXIN D, HEAVY-CHAIN.
FT METAL 229 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 230 BY SIMILARITY.
FT METAL 233 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 437 INTERCHAIN (PROBABLE).
FT VARIANT 15 ND -> PV (IN STRAIN D-SA).
FT VARIANT 17 ND -> LQ (IN STRAIN D-1873).
FT VARIANT 17 K -> Q (IN STRAIN D-SA).
FT VARIANT 452 R -> T (IN STRAIN D-SA).
FT VARIANT 457 R -> F (IN STRAIN D-1873).
FT VARIANT 462 A -> D (IN STRAIN D-1873).
FT VARIANT 489 K -> N (IN STRAIN CB16).
FT VARIANT 644 N -> K (IN STRAIN CB16).
FT VARIANT 1122 Q -> R (IN STRAIN CB16).
SQ SEQUENCE 1276 AA; 146871 MW; 146871 MW; CLE50F46C8233E2 CRC64;
BXD_CLOBO length: 1276 September 1, 2004 07:06 Type: P Check: 326 ..
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1 MTWPVKDNFSDPVNDNLIYRIPQNKLIITPVKAFMITQNIWIPERFSSDTPNLSLK
21 24
61 PPRPTSKQSYDPSYLSLSTDEQKDTFLKGIILFKRINERDIGNKLIYLVVSPFMGDS
68 71
121 STPEDTFDTRHTTNAIEKFKENGSKWVTNIIITPSVLIFGPI
...
247 KRIQVSEGFSDQPNVQFEELYTFGLDVEIIPQIERSQLREKALGHYKDIAKRLNN
297
307 INKTIPSSWISNIDKYKIFSBKYNFDKNTGCVFNVIDKNSLYSDLNNVSEVYSSQ
322 351
367 YNVKNRTHFSRHLFPANILDDNIYTRDGNLTNKGFNISGQNIERNPALQKLSS
380
427 ESWVDLF
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480 ETNVQNSDKFSLDESILDGQVPINPEIVDPLLVNVMPELNPGBEIVFYDDITKYVDY
530 536
540 LNSVYLESQKLSNNVENITLTSVEEALGYSNKIYTFPLSLAEKVNKGVOAGLFNMAN
543 575
600 EWVEDFTTNMKKOTLDKISDVSVIIPYIGPALNIGSALRCGNFQAFAAGVAFLEGF
660 PEFTIPALGVTFVSSIQEREKIIKTINCIUEQRVKRWKDSYQWVMNLSRITTFQNH
673 701
720 NYQWYDLSYQADAIKAKIDLEYKXSGSDKENIKSQVENLKNSLDKISEAMNNINKFI
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924
934 SPWIKISKDLTNSHNEYTTINSIQNSGKLCIRNGNIEWILQDVNRKYKSLIFDYSESL
950 982
994 SHTGYTNKWFVFTIITNNIMGYMKLYNGELKOSQKIEDLDEVLKDKTIVFGIDENIDNQ
1014
1054 MLWIRDEFNFSKELSNEDINIVVEGILLNRVVKDYMGNEPLKFDTEYVIINDNVIDRYIAP
1099
1114 ESNVLVLVQYPRDSKLYTGNPITIKSVSDKNPYSRILNGDNIILHMLYNSRKYMIIRD
1146 1166
1174 TIYATQGGECSONCVYALKQSNLGNYGIGIFSINKNIVSKYKCSQIFSSFRENTMLLAD
1234 IYKPRFRFSKNAITPVAVNTYETKLLSTSSFWKFIISRDPGWYE
1235 1246

24 matches found in sequence:
Bxeclobo ; Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
(from "bt_sp.pep")
TOIG of: Bxe_clobo check: 586 from: 1 to: 1250
ID BXE_CLOBO STANDARD; PRT; 1250 AA.
AC Q00496;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
DE (Bontoxilysin E)
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Beluga,
RX MEDLINE=92181428; PubMed=1543481;
RA Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
RT "Sequences of the botulin neurotoxin E derived from Clostridium
botulinum type E (strain Beluga) and Clostridium butyricum (strains
ATCC 43181 and ATCC 43755).";
RL Biochem. Biophys. Res. Commun. 183:107-113(1992).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=92174922; PubMed=1541280;
RA Whelan S.M., Elmore M.J., Bodsworth N.J., Atkinson T., Minton N.P.;
RT "The complete amino acid sequence of the Clostridium botulinum type-E
neurotoxin, derived by nucleotide-sequence analysis of the encoding
gene.";
RL Eur. J. Biochem. 204:657-667(1992).
RN [3]
RP SEQUENCE OF 1-251 FROM N.A.
RX MEDLINE=90264400; PubMed=2160960;
RA Biez T., Kurazono H., Wille M., Frevert J., Wernars K., Niemann H.;
RT "The complete sequence of botulinum neurotoxin type A and comparison
with other clostridial neurotoxins.";
RL J. Biol. Chem. 265:9153-9158(1990).
RN [4]
RP SEQUENCE OF 1-13.
RX MEDLINE=85197963; PubMed=3888113;
RA Schmidt J.J., Sathiyamoorthy V., Dasgupta B.R.;
RT "Partial amino acid sequences of botulinum neurotoxins types B and
E.";

Arch. Biochem. Biophys. 238:544-548(1985).
[5]
SEQUENCE OF 419-426.
MEDLINE=90344918; PubMed=2116911;
RA Gimenez J.A., Dasgupta B.R.;
RT "Botulinum neurotoxin type E fragmented with endoproteinase Lys-C
RT reveals the site trypsin nicks and homology with tetanus
RT neurotoxin."; Biochimie 72:213-217(1990).
RL Biochimie 72:213-217(1990).
RN [6]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=94124495; PubMed=8294407;
RA Binz T., Biasi J., Yamasaki S., Baumeister A., Link E., Suedhof T.C.,
RA Jahn R., Niemann H.;
RT "Proteolysis of SNAP-25 by types E and A botulinum neurotoxins.";
RL J. Biol. Chem. 269:1617-1620(1994).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 180-ARG-|-ILE-
CC 181 BOND IN SNAP-25.
CC -!- CATALYTIC ACTIVITY: limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel
CC formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.

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DR EMBL; X62089; CAA43999.1; -;
DR EMBL; X62683; CAA44558.1; -;
DR PIR; S08575; S08575.
DR PIR; S21178; S21178.
DR KSSP; P10845; 3BTA.
DR MEROPS; M27.002; -;
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume_
DR InterPro; IPR006025; Pept M_Zn_BS.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
KW Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT INIT MET 0
FT CHAIN 1 421 BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
FT CHAIN 422 1250 BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
FT METAL 211 211 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT SITE 212 212 BY SIMILARITY.
FT METAL 215 215 ZINC (CATALYTIC) (BY SIMILARITY).
FT METAL 215 215

FT DISULFID 411 425 INTERCHAIN (PROBABLE).
FT CONFLICT 176 176 R -> G (IN REF. 2).
FT CONFLICT 197 197 C -> S (IN REF. 2 AND 3).
FT CONFLICT 339 339 R -> A (IN REF. 2).
FT CONFLICT 772 772 I -> L (IN REF. 2).
FT CONFLICT 962 963 FE -> LQ (IN REF. 2).
FT CONFLICT 966 966 R -> A (IN REF. 2).
FT CONFLICT 1194 1194 N -> NN (IN REF. 2).
SQ SEQUENCE 1250 AA; 143712 MW; D9FCE26DDA041EB4 CRC64;

BXE CLOBO Length: 1250 September 1, 2004 07:06 Type: P Check: 586
Found using 'seq23' (havea346.key)

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271 278
281 IASKLSKVQSNPLLPYKDFEAKYGLQKDAAGIYSVINKNFNDFPKLYSTFEDLRT
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354 356
401 RGLVKKIIR
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471 ILNFSESAFGLSDEKINLTIONDAVIPKYDSNGTSDIEQHDVNMELNVFFYLDQAQKVEG
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531 ENNVLTSSITDALLBQPKIYTFSESEFINNVNKPVOAALFVSWIQOVLVDFTEANQKS
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771 KIINE
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854 MRYKNDKYVDTSGYDSNININGDVKYPTNKNQFGIYNDKLSSEVNSIQNDYIITYDNKYKN
904 911
914 FSISSFWRIPNDYNDKIVNVNNEYTIINCMDNNSGKVSINHNHEIITWFEDNRGINQKLA
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974 PNYGNANGISDIYINKWIFVTITNDRGLGSKLYINGNLIDOKSILNLGNHVSNDILPKIV
996

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976
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1154 1224
SKTHFLPYADTATTNKBKTIKISSGNRFNQVVVMSVGNCTMNFKNNGNIGLLGFK
ADTVVASTWYTHMRDHTNSNGCFWNFISEEHGWQEK
1224
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24 matches found in sequence:
bxe_clobu ; Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
(from "bt_sp.pep")
TOIG of: bxe_clobu check: 9545 from: 1 to: 1250

ID BXE CLOBU STANDARD; PRT; 1250 AA.
AC P30995;
DT 01-JUL-1993 (Rel. 26, Created)
DT 01-JUL-1993 (Rel. 26, Last sequence update)
DT 28-FEB-2003 (Rel. 41, Last annotation update)
DE Botulinum neurotoxin type E precursor (EC 3.4.24.69) (BoNT/E)
DE (Bontoxilysin E).
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43181, and ATCC 43755;
RX MEDLINE=92181428; PubMed=1543481;
RA Poulet S., Hauser D., Quanz M., Niemann H., Popoff M.R.;
RT "Sequences of the botulinum neurotoxin E derived from Clostridium
BT botulinum type E (strain Beluga) and Clostridium butyricum (strains
RT ATCC 43181 and ATCC 43755).";
RL Biochem. Biophys. Res. Commun. 183:107-113(1992).
RN [2]
RP SEQUENCE OF 1-251 FROM N.A.
RC STRAIN=BL6340;
RX MEDLINE=91237316; PubMed=2033376;
RA Fujii N., Kimura K., Murakami T., Indoh T., Tsuzuki K.,
RA Yokosawa N., Yashiki T., Oguma K.;
RT "Cloning of a DNA fragment encoding the 5'-terminus of the botulinum
RT type E toxin gene from Clostridium butyricum strain BL6340.";
RL J. Gen. Microbiol. 137:519-525(1991).
RN [3]
RP SEQUENCE OF 1-48.
RC STRAIN=5262;
RA Gimenez J., Foley J., Dasgupta B.R.;
RT "Neurotoxin type E from Clostridium botulinum and C. butyricum;
RT partial sequence and comparison.";
RL FASEB J. 2:A1750-A1750(1988).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE.
CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
CC neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
CC detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
CC heavy chain (H). The light chain has the pharmacological activity,
CC while the N- and C-terminal of the heavy chain mediate channel

```

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CC formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of
CC botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; X62088; CAA43998.1; -.
CC EMBL; X53180; CAA37321.1; -.
CC PIR; JH0256; JH0256.
CC HSRP; P10845; 3BTA.
CC MEROPS; M27.002; -.
CC InterPro; IPR008985; ConA like lec gl.
CC InterPro; IPR002160; Kunitz legume_g.
CC InterPro; IPR006025; Pept_M_Zn_BS.
CC InterPro; IPR000395; Peptidase_M27.
CC Pfam; PF01742; Peptidase_M27; 1.
CC PRINTS; PR00760; BONTOXILYSIN.
CC ProDom; PD001963; Bontoxilysin; 1.
CC PROSITE; PS00142; ZINC_PROTEASE; 1.
CC Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc.
FT INIT_MET 0 0
FT CHAIN 1 421 BOTULINUM NEUROTOXIN E, LIGHT-CHAIN.
FT CHAIN 422 1250 BOTULINUM NEUROTOXIN E, HEAVY-CHAIN.
FT METAL 211 211 ZINC (CATALYTIC) (BY SIMILARITY).
FT ACT_SITE 212 212 BY SIMILARITY.
FT METAL 215 215 ZINC (CATALYTIC) (BY SIMILARITY).
FT DISULFID 411 425 INTERCHAIN (PROBABLE).
FT CONFLICT 229 229 K -> M (IN REF. 2).
SQ SEQUENCE 1250 AA; 143265 MW; 8171B5B2C312857 CRC64;

BXE CLOBU Length: 1250 September 1, 2004 07:06 Type: P Check: 9545
Found using 'seq23' (hayes346.key)

1 PTINSFNYPVNNRTILYIKPGGQQFYKSFNIMKNIWIIPERNVIGTIPQDFLPPTSL
29 32

61 KNGDSSYYDPNVLQSDQEKKE

...

221 YGAGITTKYITQKQPLITNIRGTNIEEFLTFGGTDLNITSAQSNIDIVTNLLADYKK
271 278

281 IASKLSKVQVSNPLNPFYKQVFEAKYGLDKDASGIYSVYNKFNIDIFKLYSTFEFLAT
281 298

341 KFOVKCRQTYIGQYFKPLKSLNLLNDSIYINISEGYNNLNKVNFRQGNANLNPIRITPTIG
354 356

401 RGLVKKIIR

...

471 ILNFNSAPGLSDEKLNLTIQNDAYIKPYDSNGTSDIEQHDVNLNLFVFFYFLDAQVKPEG
521

531 ENNVNLTSSIDTALLEQPKIYTFSSSEFINNVNKFVQAALFVGWIIQQLVDFTFTEANQKS

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551
591 TVDKTIADISIVVYIGLALNIGNEAKGNFKDALELLGAGILLEPEPELLIPTILVFTIK
604
651 SFLGSSDNKNKVIKAINNALKERDEKWEKVFISVSNWMTKINTQPKRKQKQYQALQNO
681
711 VNALKAIIESKNSYLEBEKNELTNKYDIEQIENELNQKVSIAMNNIDRFLTESSISYLM
722
771 KLINE
...
854 MRYKNDKYVDTSGYSNININGVYKYPTKNQFGIYNDKLVSEVNISQNDYIIYDNKYRN
904
914 FSIISFWRIIPNYDNKIVNVNNEYTIINCVRDNNNSGWKVSINHEIILWTIQDNSGINQKLA
936
974 FNYGNANGISDYINKWIFVTITMDRLGDSKLYINGNLIDKKSILNLGNIHVSDNLIKFIV
976
1034 NCSTYRIGIRYFNIPDKELDETEIQTLYNNENPANIILKDFWGNLYLLYDKYLYLVNLPK
1037 1045
1040
1094 NNFINRDTSTLSINNIRSTILLANLYSGIKVQIQRVNNSTNDNLVRKNDQVYINFA
1121
1154 SKTHLLPLYADTATTNKEKTIKISSGNRFQVVMNSVGNCTMFKNNNGNNGNIGLGFK
1224
1214 ADTVVASTWYTHMRDNTNSNGFFWNFISEHGWQEK
1224
-----
29 matches found in sequence:
bxclobo; Botulinum neurotoxin type E, nontoxic component.
(from "bt_sp.pep")
TOIG of: bxclobo check: 8485 from: 1 to: 1162
ID EXEN CLOBO STANDARD; PRT; 1162 AA.
AC P46082;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type E, nontoxic component.
ENT-120.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Mashike;
RX MEDLINE=93195515; PubMed=8450310;
RA Fujii N., Kimura K., Yokosawa N., Yashiki T., Tsuzuki K., Oguma K.;
RT "The complete nucleotide sequence of the gene encoding the nontoxic
component of Clostridium botulinum type E progenitor toxin.";
RL J. Gen. Microbiol. 139:79-86(1993).
CC -!- FUNCTION: THE NONTOXIC COMPONENT IS NECESSARY TO MAINTAIN
TOXICITY.
```

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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; D12697; BAA02194.1;
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PRO0760; BONTOXIDYISIN.
DR ProDom; PD001963; Bontoxilysin; 1.
KW Neurotoxin.
SQ SEQUENCE 1162 AA; 136856 MW; 96468EDDDAE0F39D CRC64;

BXEN CLOBO Length: 1162 September 1, 2004 07:06 Type: P Check: 8485
Found using 'seq23' (hayes346.key)

...
80 ATIKLLQRIINNNGVAKLLSLISTAIPFPYENNTDYRQTNVYLSSKKNHEHYTANLVIFG
130
140 PGSNIIKNNVIYKKEVAESGMGTMLEIWFQPLTHKYDEFYVDPALELIKCLIKLSLYL
177
200 YGIKPNNDNLNIPYLRNENFSEYSELNMDLISGIDYIKLGLNTNPNYWFIDKYFIDTSK
200 223
260 NFEKYKNDYEIKIKNNNYIANSIKLYLEQKFKINVKDIWELNLSYFSEKFEQIMMPERYNN
317
320 ALNHYYRKEFYVIDYFKNYNINGFKNGQIKTKLPLASKYNKEIINKPELIVNLINQNTVL
320
380 MKSNYVGDGLKGTVDNFYNYIIPYNLNYEHSINIFYLDNVNVEIEIEKIPPNDEDIYPY
397
440 RKNADTFIPVYNITKAKEINTTTPLPVNYLQAMIDSNDINLSSDFLKVISSKGLSVYSF
468
500 LNNTMDYLEFIKYDKPIDTDKKYKWKAKAIFRNSYLDITETQETQISNQFGDTKIIPWIGRA
500 506
522
523
560 LNLTNTNNSFVEEFKNL

...
579 ISLINKENITIPKIKIDIPSSMLNFSFKDISENLFNYCKNFKYKKNFYLNFLQDQWWT
629
630
639 QYYSQYFDIICMASKSVLAQEKLIKLIQKQLRYLMENSNISSTNLILINLTTTLTLDI
641
644
```

699 SNOSQIAINNIDKFFNNAAMCVFENNIPYKFTSPWEQCIKNINKSTKEFILKCTNINETE
726
759 KSHLIMQNSFSLNDFDLQNMKNLNLTYELLIKBQTSYBLSYAFQEQDNNVIGDT
788
819 SGKNTLVEYPKDIGLVYGINNAIHLTGANQIKFTNDYPENGLTNNFSIYFWLNLKQN
869
879 TIKSKLIGSKEDNCGWBIYFENDGLVFNIDISNGNEKNIYLSNKSWHYIVISINRLK
929
939 DQLLIFIDNILVANEDIKEILNIYSSDIISLLSDNNVYIEGLSVLAKTINSBILTDYF
999 SDLNNSYIRNFDEEILQYNRTYELFVFPBIAINKIEQNNNIYLSINNENNLNFKPLKF
1020
1059 KLNTNPNKQYVQWDEVFSVLGTEKYLIDISTNNRIQLVDNKNNAQIPIINNDIFIS
1087
1119 NCLTLTNVNVYLSIKNQDYNWICDLNHDIPKKSYLWILKNI
1125 1131 1139

28 matches found in sequence:

bxenclobu ; Botulinum neurotoxin type E, nontoxic component.
(from "bt_sp.pep")

TOIG of: bxen_clobu check: 7133 from: 1 to: 1162

ID BXEN_CLOBU STANDARD; PRT; 1162 AA.
AC Q06366;
DT 01-FEB-1995 (Rel. 31, Created)
DT 01-FEB-1995 (Rel. 31, Last sequence update)
DT 01-NOV-1995 (Rel. 32, Last annotation update)
DE Botulinum neurotoxin type E, nontoxic component.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL6340;
RX MEDLINE=93360835; PubMed=8355622;
RA Fujii N., Kimura K., Yokosawa N., Oguma K., Yashiki T.,
RA Takeshi K., Ohyama T., Isogai E., Isogai H.;
RT "Similarity in nucleotide sequence of the gene encoding nontoxic
RT component of botulinum toxin produced by toxigenic Clostridium
RT butyricum strain BL6340 and Clostridium botulinum type E strain
RT Mashike.";
RL Microbiol. Immunol. 37:395-398(1993).
CC -!- FUNCTION: THE NONTOXIC COMPONENT IS NECESSARY TO MAINTAIN
CC TOXICITY.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; D12739; BAA02231.1; -.
DR PIR; I40817; I40817.
DR InterPro; IPR008985; ConA like lec_g1.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR

DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
KW Neurotoxin. 1162 AA; 136829 MW; C86E9BE932DA78E4 CRC64;
SQ SEQUENCE
BXEN CLOBU Length: 1162 September 1, 2004 07:06 Type: P Check: 7133 ..
Found using 'seq23' (hayes346.key)
...
80 ATIKLQRIINNNGVAKLLSLISTAIPFPYENNTEDYRQTNLYSSKNEHYTTANLVIFG
130
140 PGSNIIKNNVIYYKKEYAENGMTLSEIWFPQFLTHKYDEFYVDPALFLKCLIKLSLYL
177
200 YGIKPDNLNIPYRLRNEFNSLEYSELDMDIFLISGGIDYKLLNTNPPYWFIDKYFIDTSK
200 223 239 247
260 NFEKYKNDYEIKKNNYIANSIKLYLEQKPKINVKDIWELNLSYFSKKEFQIMMPERYNN
317
320 ALNHYRKEFVVIDYFKNYNINGFKNGQIKTKPLSKYKKEIINKPELIVNLINQNNIVL
320
380 MKSNFYGDGLKGNVDNFYSNVIIPYNLNYSIHSINYSYLDNWNIEIEIKPIPNDEDIYFY
397 414
440 RKNADTFIPVNYITKAKEINTTLPVNYLOAQMIDNSDNLSSDFLKVSSKSLYSF
468 497
500 LNNYMDYLEFIKYDKPIDTDKKYKWLKALFRNYSYLDITETOEISNOFGDTKIIPWIGRA
500 506 522 523
560 LNILNTNNSFVEEPKNI
579 IFLINKKENITIPKIKIDEIPSSMLNFSFKDLSNLFNIYCKNNFYLKLYYNFLDQWWT
629 630
639 QYYSQYFDLICMAKSVLAQEKLIKLIQKQLRYLMENSNISSNLIILNLTNTLTLRDI
641 644
699 SNOSQIAINNIDKFFNNAAMCVFENNIPYKFTSPWEQCIKNINKSTKEFILKCTNINETE
726
759 KSHLIMQNSFSLNDFDLQNMKNLNLTYELLIKBQTSYBLSYAFQEQDNNVIGDT
788
819 SGKNTLVEYPKDIGLVYGINNAIHLTGANQIKFTNDYPENGLTNNFSIYFWLNLKQN
869
[...]


```

372
417 PDKGLVEKI
...
481 NNVNRLDEVLDYNSQITIPQISNRTNLTLVQDNSYVPRYDSNGTSEIEEYDVVDVNFVF
    |--|
531
541 YLHAQKVPGETNLSLTSSIDTALLRESKOIFFSFEFIDTINKPVAALFDWISKVIRD
541
601 FTTEATQKSTVDKIADISLIVPYVGLALNIIEAKGNFEAPELLGVGILLLEFVPELTI
    |--|
623
661 PVILVFTIKSYIDSYENKKAINKAINSLIEREAKWEIYSWIVSNMLTRINTQFNKRKE
    |--|
700
721 QMYQALQNDVAIKTAIEYKYNNTSDEKNLESEYNNINIEELNKKVSLAMKNIERFM
    |--|
741
781 TESSISYLMKLINE
...
812 LNYILDHRSILGEQTNELSDLVSTLNSIIPFELSSTYNDKILIIYFNRLYKIKDSSIL
    |--|
862
872 DMYENNKFDISGYGNSISNGVNIYSTNRNOFGIYNSRLSEVNIAQNNDLIYNSRYQ
    |--|
930
932 NFSISFWVRIPKPKVPMHNEEYTIINCWMGNNSGWKISLRTVDCBLIWTLDQTSNGKE
    |--|
945
954
992 NLIPRYEELNRAISNYINKWIFVTITNRLGNSRIYINGNLIVEKISNIGLDIHVSDNILF
    |--|
997
1052 KIVGCDDETYGIRYFKVFNTTELKTEIETLYSNEPDPSILKNYWGNYLLYKYYLFNL
    |--|
1061
1066
1099
1106
1112 LRKDKYITLNSGILNINQORGTEGVSFLNKLKYGEGVEIIRKNGPIDISNTDNFVRKND
    |--|
1117
1142
1145
1172 LAYINVVDRGVEYRLYADTKSEKEKIIRTSNLNDSLGLIIVMDSIGNCTNWFQNNNGSN
    |--|
1174
1184
1232 IGLGPHSNLNVASSWYNNIRNTSSGCFWSSISKENGWKE
    |--|
1249
-----
29 matches found in sequence:
bxg_clobo ; Botulinum neurotoxin type G precursor (EC 3.4.24.69) (BoNT/G)
(from "bt.sp.pep")
TOIG of: bxg_clobo check: 1561 from: 1 to: 1296

ID BXG_CLOBO STANDARD; PRT; 1296 AA.
AC Q60393;
DT 01-NOV-1997 (Rel. 35, Created)
```

```

01-NOV-1997 (Rel. 35, Last sequence update)
28-FEB-2003 (Rel. 41, Last annotation update)
Botulinum neurotoxin type G precursor (EC 3.4.24.69) (BoNT/G)
(Bontoxilysin G).
BORG.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=113 / 30;
RX MEDLINE=94092745; PubMed=8268233;
RA Campbell K., Collins M.D., East A.K.;
RT "Nucleotide sequence of the gene coding for Clostridium botulinum
(Clostridium argentinense) type G neurotoxin: genealogical comparison
with other clostridial neurotoxins.";
RL Biochim. Biophys. Acta 1216:487-491(1993).
CC -!- FUNCTION: BOTULINUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
ENDOPEPTIDASE.
CC -!- CATALYTIC ACTIVITY: Limited hydrolysis of proteins of the
neuroexocytosis apparatus, synaptobrevins, SNAP25 or syntaxin. No
detected action on small molecule substrates.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: Disulfide-linked heterodimer of a light chain (L) and a
heavy chain (H). The light chain has the pharmacological activity,
while the N- and C-terminal of the heavy chain mediate channel
formation and toxin binding, respectively.
CC -!- SUBCELLULAR LOCATION: Secreted (By similarity).
CC -!- MISCELLANEOUS: There are seven antigenically distinct forms of
botulinum neurotoxin: Types A, B, C1, D, E, F, and G.
CC -!- SIMILARITY: Belongs to peptidase family M27.
-----
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EMBL; X74162; CAA52275.1; --
DR HSPSP; P10845; 3BTA.
DR MEROPS; M27.002; --
DR InterPro; IPR008985; ConA_like_lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin; Hydrolase; Metalloprotease; Zinc.
FT INIT MET 0 0
FT CHAIN 1 441
FT CHAIN 442 1296
FT METAL 229 229
FT ACT SITE 230 230
FT METAL 233 233
FT DISULFID 435 449
SQ SEQUENCE 1296 AA; 149013 MW; DC8E47E15F665C31 CRC64;
BXG_CLOBO Length: 1296 September 1, 2004 07:06 Type: P Check: 1561
Found using 'seq23' (hayes346.key)
|---|
|---|
1 PVNIKFYNDPINDDIIMPEPNDPGYTKAFRIIDRIWIVPFTYGFQPDQENA
32 35
```

```
33 36
61 STGVFSKQVVEYDPTYLTKDAEKDFLTKMTIKLFNRINSPKSGQRLDMIVDAIPYLG
70 73
121 AST
...
238 LYGIKISNLPITPNTKEFFMQHSDPVQAEELYTFGCHDPSVISPTDMNLYNKAQNFD
288
298 IANRLNIVSSAQSGIDISLYKQIYKKNKYDFVBDPNKGYSVDKDFDKLYKALMFGFTET
318 326
358 NLAGYGIKTRYSYSEYLPPIKTEKLLDNTIYTQNEGFNIASKNLKTFFNGQNKAVNKE
369
418 AYEISLHLVIRIAMCKPVMYKNTGKSEQCIIVNEDLFFIANKDSFSKOLAKAETIA
419 430
478 YNTQNN
...
494 LILDNLSSGIDLPNENTPFTNFDDIDIPVIKQSAKKIFVDGDSLSFEYHQAFTPSN
544
554 IENLQLTNSLNDALRNNKVYTFSTNLVEKANTVVGASLFVNWVGVIDDFTSESTQKS
574
614 TIDKVS DSVIIPY
...
651 GAAILMEFPELIVPIGVFTLESYVGNKGHIIMTISNALKXRDQKWTMDMYGLIVSQWLS
701
711 TVNTQPTIKERMYNALNQSAIEKXIEDQYNRYSEEDKMNINIDFNDFKLNQSNIL
724 742
771 AINNIDDFINQCSISYLMNRMPLA
...
875 RGRLLDSSGCGATMNVGSDVIFNDIGNQFKLNNSENITAHQSKFVYVSPDNFSI
925
935 NFWRTPKYNNNDIQTLQNEYTIISCIKNSGKVSIGKNRIIWTLIDVNAKSIFFE
956
995 YSIKONISDYINKWF
...
1055 TDTTKFVWKDFNIFGRELNATEVSSLYIQSNTNLKDFWGNPLRYDTQYLYFNQGMQN
1105
1115 IYIKFSKASMGETAPTNFNNAIYNQNLGLRFLIKKASNRNNDNIVREGDIY
1172
1174
```

```
1116 1141 1145 1172 1174
--| |--| |--| |--|
1175 LAINDISDESRYVYVLVNSKEIQTLFLAPINDPFTFYDVLQIKKKYKTYNCQILCEK
1175 1185 1212
1177 1188
1235 DTKTFLGFGKFKVDYGYWDTYDNFYFCISQWYLRISENINKLRGNCWQFIPVDEGW
1251 1258 1261
1295 TE
-----
4 matches found in sequence:
hal7c1obo ; Hemagglutinin component HA-17 (HA 17 kDa subunit).
(from "bt.sp.pap")
TOIG of: hal7_c1obo check: 6580 from: 1 to: 145
ID HA17_C1OBO STANDARD; PRT; 145 AA.
AC F46083;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-FEB-1996 (Rel. 33, Last sequence update)
DT 15-DEC-1998 (Rel. 37, Last annotation update)
DE Hemagglutinin component HA-17 (HA 17 kDa subunit).
GN HA-17 OR ANTP-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 1-20.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT "Molecular construction of Clostridium botulinum type C progenitor
RT toxin and its gene organization.";
RL Biochem. Biophys. Res. Commun. 205:1291-1298 (1994).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Type C Stockholm / C-ST / 468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C 468.";
RL Mol. Gen. Genet. 243:631-640 (1994).
CC -! SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC
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CC
CC -----
CC EMBL; X62389; CAA44260.1; -
CC EMBL; S74768; AAE32848.1; -
CC EMBL; X72793; CAA51310.1; -
CC InterPro; IPR008903; Botulinum HA-17.
CC InterPro; IPR00772; Ricin B lectin.
CC Pfam; PF05588; botulinum HA-17; 1.
CC SMART; SM00458; RICIN; 1.
CC Hemagglutinin.
KW
```

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FT INIT MET 0
SQ SEQUENCE 145 AA; 16531 MW; D5EPAB577336D710 CRC64;

HA17 CLOBO Length: 145 September 1, 2004 07:06 Type: P Check: 6580
Found using 'seq23' (hayes346.key)

1 SSBRTPLPNGYIKSLFSDSLYLYTSGGALSPFNTSSLDNQKWKLEVISSNGFRFSNV
  23 26
  |--|
  |---|
  66 69 72 75
  69 72

61 AEPNKYLAYNDYGFYILSSSSNSLWNPKIKAINSYIICTLISVNVTDYAWTIYDNNNNI
  66 69 72 75
  69 72

121 TDQPI

...

5 matches found in sequence:
ha33cloblo ; Main hemagglutinin component (HA 33 kDa subunit).
(from "bt.sp.pep")
TOIG of: ha33_cloblo check: 7829 from: 1 to: 285

ID HA33 CLOBO STANDARD; PRT; 285 AA.
AC P46084;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-FEB-1996 (Rel. 33, Last sequence update)
DT 16-OCT-2001 (Rel. 40, Last annotation update)
DE Main hemagglutinin component (HA 33 kDa subunit).
DE HA-33 OR ANTP-33.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND PARTIAL SEQUENCE.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=90382931; PubMed=2205574;
RA Tsuzuki K., Kimura K., Fujii N., Yokosawa N., Indoh T.,
RA Murakami T., Oguma K.;
RT "Cloning and complete nucleotide sequence of the gene for the main
RT component of hemagglutinin produced by Clostridium botulinum type
RT C.";
RL Infect. Immun. 58:3173-3177(1990).
RN [2]
RP SEQUENCE OF 268-285 FROM N.A.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT toxin and its gene organization.";
RT "Molecular construction of Clostridium botulinum type C progenitor
RT Clostridium."
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 7-29 AND 193-212.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT "Molecular construction of Clostridium botulinum type C progenitor
RT toxin and its gene organization.";
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Type C Stockholm / C-ST / 468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C 468.";
RN Mol. Gen. Genet. 243:631-640(1994).
CC CC -!- SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC -!- SIMILARITY: Contains 2 ricin B-type lectin domains.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
DR EMBL; X62389; CAA44261.1; -.
DR EMBL; X53041; CAA37210.1; -.

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DR EMBL; S74768; AAB32847.1; -.
DR InterPro; IPR000772; Ricin B lectin.
DR InterPro; IPR008997; RicinB_Like.
DR Pfam; PF00652; RicinB_lectin; 6.
DR SMART; SMO0458; RICIN; 2.
DR PROSITE; PS0231; RICIN B LECTIN; 2.
KW Hemagglutinin; Lectin; Repeat.
FT DOMAIN 11 139 RICIN B-TYPE LECTIN 1.
FT DOMAIN 179 283 RICIN B-TYPE LECTIN 2.
SQ SEQUENCE 285 AA; 33621 MW; C016733591A29C4B CRC64;

HA33 CLOBO Length: 285 September 1, 2004 07:06 Type: P Check: 7829
Found using 'seq23' (hayes346.key)

...

41 SGANQKWLTYDYNKQAYKIKVMDNTSLITWNPASSVSVKTDNNGNQYWLQNYIS
  91 94
  |--|
  |---|
  143

101 RNVIRNMPNLVLQYNIDDTLMVSTQTSSNQFFKFSNCIYEALNRRNCKLTQLNSD
  229 242
  |--|
  |---|
  206

161 RFLSKNLNSQIIVLQWFDSSRQKWIIEYNETKSAYTLKQENNRVLTWQNSNNYVETY
  206

221 QSTDLSIQYWNVYLDNDASKYILYNLQDTRVLDVNSQIANGTHVIVDSYHGNTNQOW
  229 242
  |--|
  |---|
  281 IINLI

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19 matches found in sequence:
ha70cloblo ; Hemagglutinin components HA-53 and HA-22/23 precursor.
(from "bt.sp.pep")
TOIG of: ha70_cloblo check: 5580 from: 1 to: 623

ID HA70 CLOBO STANDARD; PRT; 623 AA.
AC P46085;
DT 01-NOV-1995 (Rel. 32, Created)
DT 01-NOV-1995 (Rel. 32, Last sequence update)
DT 15-DEC-1998 (Rel. 37, Last annotation update)
DE Hemagglutinin components HA-53 and HA-22/23 precursor.
DE HA-70 OR ANTP-70.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A., AND SEQUENCE OF 7-29 AND 193-212.
RC STRAIN=Type C Stockholm / C-ST;
RX MEDLINE=95100958; PubMed=7802661;
RA Fujinaga Y., Inoue K., Shimazaki S., Tomochika K., Tsuzuki K.,
RA Fujii N., Watanabe T., Ohyama T., Takeshi K., Inoue K., Oguma K.;
RT "Molecular construction of Clostridium botulinum type C progenitor
RT toxin and its gene organization.";
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=Type C Stockholm / C-ST / 468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C 468.";
RN Mol. Gen. Genet. 243:631-640(1994).
CC CC -!- SUBUNIT: HA IS COMPOSED OF SUBCOMPONENTS HAVING 53, 33, 22-23, AND
CC 17 kDa. BOTULINUM TOXINS ARE PRODUCED AS PROGENITOR TOXINS OF
CC LARGE MOLECULAR SIZES OF 12S (M TOXIN), 16S (L TOXIN) AND 19S (LL
CC TOXIN). M TOXIN CONSISTS OF A NONTOXIC COMPONENT AND THE
CC NEUROTOXIN. L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC -!- SIMILARITY: L TOXIN CONSISTS OF THE M TOXIN AND HA.
CC -----

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CC CC -----
DR DR EMBL; D38562; BAA07575.1; -
DR DR EMBL; S74768; AAB32849.1; -
DR DR EMBL; X72793; CAA51309.1; -
DR DR InterPro; IPR003897; Clienterotox.
DR DR Pfam; PF03505; Clienterotox; 2.
DR DR PRINTS; PR01394; CLIENTEROTOXN.
DR DR Hemagglutinin.
FT FT CHAIN 7 192 HEMAGGLUTININ COMPONENT HA-23A
FT FT (POTENTIAL).
FT FT CHAIN 10 192 HEMAGGLUTININ COMPONENT HA-23B
FT FT (POTENTIAL).
FT FT CHAIN 13 192 HEMAGGLUTININ COMPONENT HA-22A
FT FT (POTENTIAL).
FT FT CHAIN 15 192 HEMAGGLUTININ COMPONENT HA-22B
FT FT (POTENTIAL).
FT FT CHAIN 193 623 HEMAGGLUTININ COMPONENT HA-53.
FT FT SEQUENCE 623 AA; 70649 MW; 115FBF1B2F3FB667 CRC64;
SQ SQ
HA70_CLOBO Length: 623 September 1, 2004 07:06 Type: P Check: 5580
Found using 'seq23' (hayes346.key)
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20 NLADGNVYVNRGDGWLGRQNQNLGNISNNGCTAIVGLRIRRETATPYPTASFNERY
70 73
80 IKNNVQVNFANFTEASEIPGFEKFTAPSKNSLYQYVIRVEIKVLQNTVTERAV
114 119 124
116 121
140 LYVPSLGVYKSTFESEBQIDKNFYFTSDQKILNEKFIYKIDDTITVKESKNSNNIN
179
200 FNTSQITLPPNGLYVINKDGYMRTNDKDLICTLLIESSTSGSIQPLRNTTRPLFNT
260 SNPTTFSQETEARLNDAPNIQLENTSTTLFKFVEAPKNKISMVKYNTYKYLINYO
269 307 313
310
320 NGNIDDKAEYVLPGLKCEVSDAPSPQAPVETPDQDGFQIQTGNENIIVGVPSENI
380 BEISTPIPDYTYNIPTSIQNACVYLFKVTGTVYKVIKTKNNLPLLIYEAGSSNRNM
404 429
440 NSNNLSNDNIKAIVITGLNRSDAKSYLVLFKDKNNYIRIPQISSSTTSQLIKFKEIG
466 478
500 NISDLADSTVNILDNLNTSGTHYTRQSPDVGNYSYVQLTIPGDFNNIASSIFSPFRNN
533
560 QGIGTLYRLTESINGNLYLNTINNYSOLLNNVEPISLLNGATVIFRVKVTALNNYIFDA
575 583
613
620 YRNS
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1 match found in sequence:
rac1cavpo ; Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Sigma 1
(from "bt.sp.pep"))
TOIG of: rac1_cavpo check: 9541 from: 1 to: 77
ID RAC1_CAVPO STANDARD; PRT; 77 AA.
AC P80236; Q9QUV9;
DT 01-OCT-1993 (Rel. 27, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 16-OCT-2001 (Rel. 40, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Sigma 1
DE component protein p22) (fragment).
GN RAC1.
OS Cavia porcellus (Guinea pig).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Hystricognathi; Caviidae; Cavia.
OX NCBI_TaxID=10141;
RN [1]
RP SEQUENCE OF 1-69.
RX MEDLINE=92018254; PubMed=1922386;
RA Abo A., Pick E., Hall A., Totty N., Teahan C.G., Segal A.W.;
RT "Activation of the NADPH oxidase involves the small GTP-binding
RT protein p21rac1.";
RL Nature 353:668-670(1991).
RN [2]
RP SEQUENCE OF 1-22; 39-53 AND 60-77.
RC STRAIN=Hartley; TISSUE=Macrophage;
RX MEDLINE=94039069; PubMed=8223583;
RA Pick E., Gorzalczyk Y., Engel S.;
RT "Role of the rac1 p21-GDP-dissociation inhibitor for rho heterodimer
RT in the activation of the superoxide-forming NADPH oxidase of
RT macrophages.";
RL Eur. J. Biochem. 217:441-455(1993).
CC -!- FUNCTION: Rac1 p21/rho GDI heterodimer is the active component of
CC the cytosolic factor sigma 1, which is involved in stimulation of
CC the NADPH oxidase activity in macrophages.
CC -!- SUBUNIT: Forms a heterodimer with rho-GDI.
CC -!- SUBCELLULAR LOCATION: Cytoplasmic and membrane-bound.
CC -!- PTM: The N-terminus is blocked.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
DR PIR; S38767; S38767.
DR HSP; P15154; LMH1.
DR InterPro; IPR001806; Ras_trnsfrmng.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTRNSFRMNG.
KW GTP-binding.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8810 MW; 8858AB9FAA15F8BF CRC64;
RAC1_CAVPO Length: 77 September 1, 2004 07:06 Type: P Check: 9541
Found using 'seq23' (hayes346.key)
1 AKWYEVHRHCNPTPIILVGTKLRLDRDKDTIEKLKEKLTPTTYPQGLAMAKEIGA
4 7
...
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2 matches found in sequence:
rac1human ; Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Ras-like
(from "bt.sp.pep"))
TOIG of: rac1_human check: 7938 from: 1 to: 192
ID RAC1_HUMAN STANDARD; PRT; 192 AA.
AC P15154; O95501; Q9BTE4;
DT 01-APR-1990 (Rel. 14, Created)
DT 01-APR-1990 (Rel. 14, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 1 (p21-Rac1) (Ras-like
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DE protein TC25).
GN RAC1.
OS Homo sapiens (Human),
OS Mus musculus (Mouse), and
OS Bos taurus (Bovine),
OS Canis familiaris (Dog).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606, 10090, 9913, 9615;
[1]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Human;
RC MEDLINE=89380250; PubMed=2674130;
RX Didsbury J., Weber R.F., Bokoch G.M., Evans T., Snyderman R.;
RA "Rac, a novel ras-related family of proteins that are botulinum toxin
RT substrates.";
RL J. Biol. Chem. 264:16378-16382(1989).
[2]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Human;
RC MEDLINE=90205863; PubMed=2108320;
RX Drivas G.T., Shih A., Coutavas E., Rush M.G., D'Eustachio P.;
RA "Characterization of four novel ras-like genes expressed in a human
RT teratocarcinoma cell line.";
RL Mol. Cell. Biol. 10:1793-1798(1990).
[3]
RN SEQUENCE FROM N.A. (ISOFORMS A AND B).
RP SPECIES=Human;
RC MEDLINE=20517245; PubMed=11062093;
RX Matos P., Skaug J., Marques B., Beck S., Verissimo F., Gespach C.,
RA Boavida M.G., Scherer S.W., Jordan P.;
RT "Small GTPase Rac1: structure, localisation and expression of the
RL human gene.";
RL Biochem. Biophys. Res. Commun. 277:741-751(2000).
[4]
RN SEQUENCE FROM N.A. (ISOFORMS A AND B).
RP SPECIES=Human;
RC TISSUE=Colon, and Skin;
RX MEDLINE=20065162; PubMed=10597294;
RA Jordan P., Brazao R., Boavida M.G., Gespach C., Chaetre E.;
RT "Cloning of a novel human Rac1b splice variant with increased
RL expression in colorectal tumors.";
RL Oncogene 18:6835-6839(1999).
[5]
RN SEQUENCE FROM N.A. (ISOFORM B).
RP SPECIES=Human;
RC Schnelzer A., Knaus U., Prechtel D., Dehne K., Harbeck N., Gerhard M.,
RA Schmitt M., Lengyel E.;
RT "Mutations and altered expression of Rac1 in human breast cancer --
RL characterization of a new Rac1 isoform, Rac1ins.";
RL Submitted (MAR-1999) to the EMBL/GenBank/DBJ databases.
[6]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Human;
RC Puhl H.L. III, Ikeda S.R., Aronstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RL sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
[7]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Human; TISSUE=Pancreas, and Skin;
RC Strausberg R.;
RL Submitted (MAR-2001) to the EMBL/GenBank/DBJ databases.
[8]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Mouse; TISSUE=Thymus;
RX MEDLINE=91270906; PubMed=1905006;
RA Moll J., Sansig G., Fattori E., van der Putten H.;
RT "The murine rac1 gene: cDNA cloning, tissue distribution and
RL regulated expression of rac1 mRNA by disassembly of actin
RL microfilaments.";
RL Oncogene 6:863-866(1991).
[9]

RP SEQUENCE FROM N.A. (ISOFORM A).
RC SPECIES=Mouse; STRAIN=C57BL/6J; TISSUE=Liver, and Tongue;
RX Kawai J., Shinagawa A., Shibata K., Yoshino M., Itoh M., Ishii Y.,
RA Arakawa T., Hara A., Fukunishi Y., Konno H., Adachi J., Fukuda S.,
RA Aizawa K., Izawa M., Nishi K., Kiyosawa H., Kondo S., Yamanaka I.,
RA Saito T., Okazaki Y., Gojobori T., Bono H., Kasukawa T., Saito R.,
RA Kadota K., Matsuda H.A., Ashburner M., Batalov S., Casavant T.,
RA Fleischmann W., Gaasterland T., Gissi C., King B., Kochiwa H.,
RA Kuehl P., Lewis S., Matsuo Y., Nikaide I., Pesole G., Quackenbush J.,
RA Schraml L.M., Staubli F., Suzuki R., Tomita M., Wagner L., Washio T.,
RA Sakai K., Okido T., Furuno M., Aono H., Baldarelli R., Barsh G.,
RA Blake J., Boffelli D., Bojunga N., Carninci P., de Bonaldo M.F.,
RA Brownstein M.J., Bult C., Fletcher C., Fujita M., Gariboldi M.,
RA Gustincich S., Hill D., Hofmann M., Hume D.A., Kamiya M., Lee N.H.,
RA Lyons P., Marchionni L., Mashima J., Mazzarelli J., Mombaerts P.,
RA Nordone P., Ring B., Ringwald M., Rodriguez I., Sakamoto N.,
RA Sasaki H., Sato K., Schoenbach C., Seya T., Shibata Y., Storch K.-F.,
RA Suzuki H., Toyooka K., Wang K.H., Weitz C., Whittaker C., Wilming L.,
RA Wyshaw-Boris A., Yoshida K., Hasegawa Y., Kawaji H., Kohtsuki S.,
RA Hayaishizaki Y.;
RT "Functional annotation of a full-length mouse cDNA collection.";
RL Nature 409:685-690(2001).
[10]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Mouse;
RC MEDLINE=22388257; PubMed=12477932;
RX Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M., Soares M.B., Bonaldo M.P., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Uesdin T.B., Toshiyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullany S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Halle S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Villalón D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahey J.J., Helton E., Kettaman M., Madan A., Rodriguez S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,
RA Schnerch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RL human and mouse cDNA sequences.";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
[11]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=Bovine;
RC MEDLINE=20264070; PubMed=10802295;
RX Davis A.R., Clements M.K., Bunger P.L., Siemsen D.W., Quinn M.T.;
RA "Cloning of bovine low molecular weight GTPases (Rac1 and Rac2) and
RT Rho GDP-dissociation inhibitor 2 (D4-GDI).";
RL Vet. Immunol. Immunopathol. 74:285-301(2000).
[12]
RN SEQUENCE FROM N.A. (ISOFORM A).
RP SPECIES=C. familiaris; STRAIN=Cocker spaniel;
RX MEDLINE=91061765; PubMed=2123294;
RA Chavrier P., Vingron M., Sander C., Simons K., Zerial M.;
RT "Molecular cloning of YPT1/SEC4-related cDNAs from an epithelial cell
RL line.";
RL Mol. Cell. Biol. 10:6578-6585(1990).
[13]
RN ISOPRENOLD.
RP MEDLINE=91236758; PubMed=1903399;
RX Kinsella B.T., Erdman R.A., Maltese W.A.;
RA "Carboxyl-terminal isoprenylation of ras-related GTP-binding proteins
RT encoded by rac1, rac2, and ralA.";
RL J. Biol. Chem. 266:9786-9794(1991).
[14]
RN INTERACTION WITH RALBP1.
RP SPECIES=Human;

RX MEDLINE=95403450; PubMed=7673236;
 RA Jullien-Plores V., Dorseuil O., Romero F., Letourneur F.,
 RA Saragosi S., Berger K., Ravitlan A., Gacon G., Camonis J.H.;
 RT "Erdling Ral GTPase to Rho pathways. RLP76, a Ral effector with
 RT CDC42/Rac GTPase-activating protein activity.";
 RL J. Biol. Chem. 270:22473-22477(1995).
 RN [15]
 RP INTERACTION WITH DOCK2.
 RX MEDLINE=20025468; PubMed=10559471;
 RA Nishihara H., Kobayashi S., Hashimoto Y., Ohba F., Mochizuki N.,
 RA Kurata T., Nagashima K., Matsuda M.;
 RT "Non-adherent cell-specific expression of DOCK2, a member of the human
 RT CDM-family proteins.";
 RL Biochim. Biophys. Acta 1452:179-187(1999).
 RN [16]
 RP INTERACTION WITH PARD6A, AND MUTAGENESIS OF GLN-61.
 RX SPECIES=Human;
 RX MEDLINE=20411249; PubMed=10954424;
 RA Johansson A.-S., Driessens M., Aspenstroem P.;
 RT "The mammalian homologue of the Caenorhabditis elegans polarity
 RT protein PAR-6 is a binding partner for the Rho GTPases Cdc42 and
 RT Rac1.";
 RL J. Cell Sci. 113:3267-3275(2000).
 RN [17]
 RP INTERACTION WITH PARD6A; PARD6B AND PARD6G; PRKCI AND PRKCG, AND
 RP MUTAGENESIS OF GLY-12 AND THR-17.
 RX SPECIES=Human;
 RX MEDLINE=21160560; PubMed=11260256;
 RA Noda Y., Takeya K., Ohno S., Naito S., Ito T., Sumimoto H.;
 RT "Human homologues of the Caenorhabditis elegans cell polarity protein
 RT PAR6 as an adaptor that links the small GTPases Rac and Cdc42 to
 RT atypical protein kinase C.";
 RL Genes Cells 6:107-119(2001).
 RN [18]
 RP INTERACTION WITH PARD6A, AND MUTAGENESIS OF GLY-12.
 RX SPECIES=Mouse;
 RX MEDLINE=20394296; PubMed=10934474;
 RA Joberty G., Petersen C., Gao L., Macara I.G.;
 RT "The cell-polarity protein Par6 links Par3 and atypical protein kinase
 RT C to Cdc42.";
 RL Nat. Cell Biol. 2:531-539(2000).
 RN [19]
 RP INTERACTION WITH PARD6B.
 RX SPECIES=Mouse;
 RX MEDLINE=20394297; PubMed=10934475;
 RA Lin D., Edwards A.S., Fawcett J.P., Mbamalu G., Scott J.D., Pawson T.;
 RT "A mammalian PAR-3-PAR-6 complex implicated in Cdc42/Rac1 and APKC
 RT signalling and cell polarity.";
 RL Nat. Cell Biol. 2:540-547(2000).
 RN [20]
 RP ACTIVATION BY PREX1.
 RX SPECIES=Human;
 RX MEDLINE=21952478; PubMed=11955434;
 RA Welch H.C.B., Coadwell W.J., Ellison C.D., Ferguson G.J., Andrews S.R.,
 RA Erdjument-Bromage H., Tempst P., Hawkins P.T., Stephens L.R.;
 RT "P-Rex1, a Ptdins(3,4,5)P3- and Gbetagamma-regulated guanine-nucleotide
 RT exchange factor for Rac.";
 RL Cell 108:809-821(2002).
 RN [21]
 RP SUBUNIT OF A COMPLEX CONTAINING ELMO1 AND DOCK1.
 RX SPECIES=Human;
 RX MEDLINE=22144530; PubMed=12134158;
 RA Brugnara E., Haney L., Grimsley C., Lu M., Walk S.F.,
 RA Tosello-Tramont A.-C., Macara I.G., Madhani H., Fink G.R.,
 RA Ravichandran K.S.;
 RT "Unconventional Rac-GEF activity is mediated through the Dock180-ELMO
 RT complex.";
 RL Nat. Cell Biol. 4:574-582(2002).
 RN [22]
 RP X-RAY CRYSTALLOGRAPHY (1.38 ANGSTROMS) OF 1-184.
 RX SPECIES=Human;
 RX MEDLINE=97185915; PubMed=9033596;
 RA Hirshberg M., Stockley R.W., Dodson G., Webb M.R.;
 RT "The crystal structure of human rac1, a member of the rho-family
 RT complexed with a GTP analogue.";
 RL Nat. Struct. Biol. 4:147-152(1997).
 RN [23]
 RP X-RAY CRYSTALLOGRAPHY (2.4 ANGSTROMS) OF COMPLEX WITH NCF2.
 RX SPECIES=Human;
 RX MEDLINE=21000498; PubMed=11090627;
 RA Lapouge K., Smith S.J., Walker P.A., Gamblin S.J., Smerdon S.J.,
 RA Rittinger K.;
 RT "Structure of the TPR domain of p67phox in complex with Rac.GTP.";
 RL Mol. Cell 6:899-907(2000).
 RN [24]
 RP X-RAY CRYSTALLOGRAPHY (2.8 ANGSTROMS) OF 1-177 IN COMPLEX WITH TIAM1.
 RX SPECIES=Human;
 RX MEDLINE=21012003; PubMed=11130063;
 RA Worthylake D.K., Rossmann K.L., Sondek J.;
 RT "Crystal structure of Rac1 in complex with the guanine nucleotide
 RT exchange region of Tiam1.";
 RL Nature 408:682-688(2000).
 RN [25]
 RP X-RAY CRYSTALLOGRAPHY (2.3 ANGSTROMS) OF 1-184.
 RX SPECIES=Human;
 RX MEDLINE=21111053; PubMed=11163217;
 RA Stebbins C.E., Galan J.E.;
 RT "Modulation of host signaling by a bacterial mimic: structure of the
 RT Salmonella effector SptP bound to Rac1.";
 RL Mol. Cell 6:1449-1460(2000).
 RN [26]
 RP X-RAY CRYSTALLOGRAPHY (2.0 ANGSTROMS) OF 1-176.
 RX SPECIES=Human;
 RX MEDLINE=20577269; PubMed=11135665;
 RA Wurtele M., Wolf E., Pederson K.J., Buchwald G., Ahmadian M.R.,
 RA Barbieri J.T., Wittinghofer A.;
 RT "How the Pseudomonas aeruginosa ExoS toxin downregulates Rac.";
 RL Nat. Struct. Biol. 8:23-26(2001).
 RN [27]
 RP X-RAY CRYSTALLOGRAPHY (2.7 ANGSTROMS) IN COMPLEX WITH ARHGDI3A.
 RX SPECIES=Human;
 RX MEDLINE=21404571; PubMed=11513578;
 RA Grizot S., Faure J., Fieschi F., Vignais P.V., Dagher M.C.,
 RA Pebay-Peyroula E.;
 RT "Crystal structure of the Rac1-RhoGDI complex involved in naph
 RT oxidase activation.";
 RL Biochemistry 40:10007-10013(2001).
 RN [28]
 RP X-RAY CRYSTALLOGRAPHY (2.5 ANGSTROMS) IN COMPLEX WITH ARFIP2.
 RX SPECIES=Human;
 RX MEDLINE=21244534; PubMed=11346801;
 RA Tarricone C., Xiao B., Justin N., Walker P.A., Rittinger K.,
 RA Gamblin S.J., Smerdon S.J.;
 RT "The structural basis of Arfapin-mediated cross-talk between Rac and
 RT Arf signalling pathways.";
 RL Nature 411:215-219(2001).
 RN [29]
 RP FUNCTION: Plasma membrane-associated small GTPase which cycles
 CC between an active GTP-bound and inactive GDP-bound state. In active
 CC state binds to a variety of effector proteins to regulate cellular
 CC responses, such as secretory processes, phagocytosis of apoptotic
 CC cells and epithelial cell polarization.
 CC -! ENZYME REGULATION: Regulated by guanine nucleotide exchange
 CC factors (GEFs) which promote the exchange of bound GDP for free
 CC GTP. GTPase activating proteins (GAPs) which increase the GTP
 CC hydrolysis activity, and GDP dissociation inhibitors which
 CC inhibit the dissociation of the nucleotide from the GTPase.
 CC -! SUBUNIT: Interacts with the GEF proteins PREX1, DOCK1 and DOCK2,
 CC which promote the exchange between GDP and GTP, and therefore
 CC activate it. Interacts with PARD6A, PARD6B and PARD6G in a GTP-
 CC dependent manner. Part of a quaternary complex containing PARD3,
 CC some PARD6 protein (PRKCI or PRKCG), which plays a central role in
 CC PKC protein (PRKCI or PRKCG), which plays a central role in
 CC epithelial cell polarization. Found in a trimeric complex composed
 CC of DOCK1 and ELMO1, which plays a central role in phagocytosis of
 CC apoptotic cells. Interacts with RALBP1 via its effector
 CC domain.


```

74 QTDVFLICFSLVSPASFENVRKWPVETVRHHCPNTPILVGTGLDLRDDKOTIEKLKEKK
    |---|
    98 101
134 LTPITYPQGLAWAKEIGA
    |---|
    64 67

-----
2 matches found in sequence:
rac2bovin ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
(from "bt_sp.pep")
TOIG of: rac2_bovin check: 9020 from: 1 to: 192

ID RAC2_BOVIN STANDARD; PRT; 192 AA.
AC Q9TU25;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
GN RAC2.
OS Bos taurus (Bovine).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Cetartiodactyla; Ruminantia; Pecora; Bovidea;
OC Bovidae; Bovinae; Bos.
OX NCBI_TaxID=9913;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=20264070; PubMed=10802295;
RA Davis A.R., Clements M.K., Burger P.L., Siemsen D.W., Quinn M.T.;
RT "Cloning of bovine low molecular weight GTPases (Rac1 and Rac2) and
RL Rho GTP-dissociation inhibitor 2 (D4-GDI).";
CC Vet. Immunol. Immunopathol. 74:285-301(2000).
CC
CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NADPH oxidase (By similarity).
CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -!- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; AF175263; AAF00715.1; -.
CC HSSP; P15153; 1DS6.
CC InterPro; IPR003578; GTPase Rho.
CC InterPro; IPR001806; Ras trnsfrmng.
CC InterPro; IPR005225; Small_GTP.
CC Pfam; PF00071; ras; 1.
CC SMART; SM00174; RHO; 1.
CC TIGRFAMs; TIGR00231; small GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine
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FT SEQUENCE 192 AA; 21424 MW; 2B5D6266AAC3210 CRC64;
SQ (By similarity).
RAC2_BOVIN Length: 192 September 1, 2004 07:06 Type: P Check: 9020
Found using 'seq23' (hayes346.key)
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14 VGKTCLLISYTTNAPFGEYIPTVFDNYSANVMVDSKPVNLGLWDTAGQEDYDLRLPLSYSP
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    64 67
74 QTDVFLICFSLVSPASYENVRKWPVETVRHHCPSTPIILVGTGLDLRDDKOTIEKLKEKK
    |---|
    90 93
134 LAPITYPQGL
    |---|
    64 67

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3 matches found in sequence:
rac2cavpo ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
(from "bt_sp.pep")
TOIG of: rac2_cavpo check: 9059 from: 1 to: 192

ID RAC2_CAVPO STANDARD; PRT; 192 AA.
AC O88931;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2).
GN RAC2.
OS Cavia porcellus (Guinea pig).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Hystricognathi; Caviidae; Cavia.
OX NCBI_TaxID=10141;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=Dunkin-Hartley;
RX MEDLINE=20010089; PubMed=10540223;
RA Lacy P., Mahmudi-Azer S., Bablitz B., Gilchrist M., Fitzharris P.,
RA Cheng D., Man S.F.P., Bokoch G.M., Moqbel R.;
RT "Expression and translocation of Rac2 in eosinophils during
RT superoxide generation.";
RL Immunology 98:244-252(1999).
CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NADPH oxidase (By similarity).
CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -!- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; AF085341; AAC35359.1; -.
CC HSSP; P15153; 1DS6.
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DR InterPro; IPR003578; GTPase_Rho.
DR InterPro; IPR001806; Ras_trnfrmg.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTRNSFRMG.
DR SMART; SM00174; RHO; 1.
DR TIGRFAMs; TIGR00231; small_GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-Geranylgeranyl cysteine
FT (By similarity).
SQ SEQUENCE 192 AA; 21408 MW; 2AE790A32A1BD986 CRC64;

RAC2 CAVPO Length: 192 September 1, 2004 07:06 Type: P Check: 9059 ..
Found using 'seq23' (hayes346.key)

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14 VGKTCLLISVTTNAPFGEXIPTVFDNYSANVMWDSKPVNLGLMDTAGQEDYDRRLPLSY
|---|
64 67

74 QTDVFLICFSLVSPASYENVHANYKVRHCHPSTPIILGTIKLDRDDKETIEKLEKK
|---|
90 93 98 101

134 LAPITYPQGLALAKEIDS

...

2 matches found in sequence:
rac2human; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (Small G
protein) (from "bt.sp.pep")
TOIG of: rac2_human check: 8838 from: 1 to: 192

ID RAC2_HUMAN STANDARD; PRT; 192 AA.
AC R15153;
DT 01-APR-1990 (Rel. 14, Created)
DT 01-MAR-1990 (Rel. 14, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (Small G
protein) (GX).
DE Rac2.
GN Homo sapiens (Human).
OS Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=89380250; PubMed=2674130;
RA Didsbury J., Weber R.F., Bokoch G.M., Evans T., Snyderman R.;
RT "Rac, a novel ras-related family of proteins that are botulinum toxin
RT substrates."
RL J. Biol. Chem. 264:16378-16382(1989).
RN [2]
RP SEQUENCE FROM N.A.
RX Fuhl H.L. III, Ikeda S.R., Aronstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RT sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RX MEDLINE=200571165; PubMed=10591208;
RA Dunham I., Hunt A.R., Collins J.E., Bruskiewicz R., Beare D.M.,
RA Clamp M., Smink L.J., Ainscough R., Almeida J.P., Babbage A.K.,
RA Bagguley C., Bailey J., Barlow K.F., Bates K.N., Beasley O.P.,
RA Bird C.P., Blakey S.E., Bridgeman A.M., Buck D., Burgess J.,
RA Burrill W.D., Burton J., Carder C., Carter N.P., Chen Y., Clark G.,
RA Clegg S.N., Cobley V.E., Cole C.G., Collier R.E., Connor R.,
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RA Conroy D., Corby N.R., Coville G.J., Cox A.V., Davis J., Dawson E.,
RA Dhami P.D., Dockree C., Dodsworth S.J., Durbin R.M., Ellington A.G.,
RA Evans K.L., Fey J.M., Fleming K., French L., Garner A.A.,
RA Gilbert J.G.R., Graham D.V., Griffiths M.N.D., Hall C.,
RA Hall R.E., Hall-Tamlyn G., Heathcott R.W., Ho S., Holmes S.,
RA Hunt S.E., Jones M.C., Kershaw J., Kimberley A.M., King A.,
RA Laird G.K., Langford C.F., Leversha M.A., Lloyd C., Lloyd D.M.,
RA Martyn I.D., Mashreghi-Mohammadi M., Matthews L.H., Mccann O.T.,
RA Mcclay J., McLaren S., McMurray A.A., Milne S.A., Mortimore B.J.,
RA Odell C.N., Pavitt R., Pearce A.V., Pearson D., Phillips B.C.T.,
RA Phillips S.H., Plumb R.W., Ramsay H., Ramsey Y., Rogers L., Ross M.T.,
RA Scott C.E., Sehra H.K., Skuce C.D., Smalley S., Smith M.L.,
RA Soderlund C., Spraggon L., Steward C.A., Sulston J.E., Swann R.M.,
RA Vaudin M., Wall M., Wallis J.M., Whiteley M.N., Willey D.L.,
RA Williams L., Williams S.A., Williamson H., Wilmer T.E., Wilming L.,
RA Wright C.L., Hubbard T., Bentley D.R., Beck S., Rogers J., Shimizu N.,
RA Minoshima S., Kawasaki K., Sasaki T., Asakawa S., Kudoh J.,
RA Shintani A., Shibuya K., Yoshizaki Y., Aoki N., Mitsuyma S.,
RA Roe B.A., Chen F., Chu L., Crabtree J., Deschamps S., Do A., Do T.,
RA Dorman A., Fang F., Fu Y., Hu P., Hua A., Kenton S., Lai H., Lao H.I.,
RA Lewis J., Lewis S., Lin S.-P., Loh P., Malaj E., Nguyen T., Pan H.,
RA Phan S., Qi S., Qian Y., Ray L., Ren Q., Shaull S., Sloan D., Song L.,
RA Wang Q., Wang Y., Wang Z., White J., Willingham D., Wu H., Yao Z.,
RA Zhan M., Zhang G., Chisoe S., Murray J., Miller N., Minx P.,
RA Fulton R., Johnson D., Bemis G., Bentley D., Bradshaw H., Bourne S.,
RA Cordes M., Du Z., Fulton L., Goela D., Graves T., Hawkins J.,
RA Hinds K., Kemp K., Latreille P., Layman D., Ozersky P., Rohlfing T.,
RA Scheet P., Walker C., Wamsley A., Wohldmann P., Pepin K., Nelson J.,
RA Korf I., Bedell J.A., Hillier L.W., Mardis E., Waterston R.,
RA Wilson R., Emanuel B.S., Shaikh T., Kuranishi H., Saitta S.,
RA Budarf M.L., McDermid H.E., Johnson A., Wong A.C.C., Morrow B.E.,
RA Edelmann L., Kim U.J., Shizuya H., Simon M.I., Dumanski J.P.,
RA Peyrard M., Kedra D., Seroussi E., Franssion I., Tapia I., Bruder C.E.,
RA O'Brien K.P., Wilkinson P., Bodenteich A., Hartman K., Hu X.,
RA Khan A.S., Lane L., Tiliahun Y., Wright H.;
RT "The DNA sequence of human chromosome 22."
RL Nature 402:489-495(1999).
RN [4]
RP SEQUENCE FROM N.A.
RC TISSUE=Brain;
RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.P., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Ustin T.B., Toshiyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullahy S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahey J., Helton E., Kettelman M., Madan A., Rodrigues S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,
RA Schnurch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences."
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
RN [5]
RP SEQUENCE OF 13-192 FROM N.A.
RX MEDLINE=91207334; PubMed=1902092;
RA Reibel L., Dorseuil O., Stancou R., Bertoglio J., Gacon G.;
RT "A hemopoietic specific gene encoding a small GTP binding protein is
RT overexpressed during T cell activation."
RL Biochem. Biophys. Res. Commun. 175:451-458(1991).
RN [6]
RP SEQUENCE OF 6-15; 97-107 AND 134-165.
RX MEDLINE=92268051; PubMed=1316893;
RA Mizuno T., Kailuchi K., Ando S., Musha T., Hiraoka K., Takeishi K.,
RA Asada M., Nunoi H., Matsuda I., Takai Y.;
```

RT "Regulation of the superoxide-generating NADPH oxidase by a small
RT GTP-binding protein and its stimulatory and inhibitory GDP/GTP
RL J. Biol. Chem. 267:10215-10218(1992).
RN [7]
RP INTERACTION WITH DOCK2.
RX MEDLINE=20025468; PubMed=10559471;
RA Nishihara H., Kobayashi S., Hashimoto Y., Ohba F., Mochizuki N.,
RA Kurata T., Nagashima K., Matsuda M.;
RT "Non-adherent cell-specific expression of DOCK2, a member of the human
RT CDM-family proteins.";
RL Biochim. Biophys. Acta 1452:179-187(1999).
RN [8]
RP ISOPRENOL.
RX MEDLINE=19236758; PubMed=1903399;
RA Kinsella B.T., Erdman R.A., Maltese W.A.;
RT "Carboxyl-terminal isoprenylation of ras-related GTP-binding proteins
RT encoded by rac1, rac2, and rala.";
RL J. Biol. Chem. 266:9786-9794(1991).
RN [9]
RP X-RAY CRYSTALLOGRAPHY (2.35 ANGSTROMS) OF COMPLEX WITH ARHGDI.
RX MEDLINE=2012627; PubMed=10655614;
RA Scheffzek K., Stephan I., Jensen O.N., Illenberger D., Gierschik P.;
RT "The Rac-RhoGDI complex and the structural basis for the regulation
RT of Rho proteins by RhoGDI.";
RL Nat. Struct. Biol. 7:122-126(2000).
CC -!- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NADPH oxidase.
CC -!- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP, GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GTP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -!- SUBUNIT: Interacts with DOCK2, which may activate it.
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated.
CC -!- TISSUE SPECIFICITY: Hematopoietic specific.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; M29871; AAA36538.1; -;
CC EMBL; AF498965; AAM21112.1; -;
CC EMBL; Z82188; CAB45265.1; -;
CC EMBL; BC001485; AAH01485.1; -;
CC EMBL; M64595; AAA35941.1; -;
CC PIR; B34386; B34386.
CC PDB; 1DS6; 19-JUL-00.
CC Genew; HGNC:9802; RAC2.
CC MIM; 602049; -;
CC GO; GO:0003924; F:GTPase activity; TAS.
CC GO; GO:0007165; P:signal transduction; TAS.
CC InterPro; IPR003578; GTPase.Rho.
CC InterPro; IPR001806; Ras trnsfrmg.
CC InterPro; IPR005225; Small_GTP.
CC Pfam; PF00071; ras; 1.
CC PRINTS; PR00449; RASTRNSFRMG.
CC SMART; SM00174; RHO; 1.
CC TIGRFAHS; TIGR00231; small_GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein; 3D-structure.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).

EFFECTOR REGION (POTENTIAL).
S-geranylgeranyl cysteine.

FT DOMAIN 32 40
FT LIPID 189 189
FT STRAND 2 10
FT TURN 12 13
FT HELIX 16 25
FT STRAND 40 45
FT STRAND 50 56
FT TURN 62 64
FT HELIX 65 67
FT TURN 68 71
FT HELIX 73 74
FT TURN 77 83
FT STRAND 84 85
FT TURN 87 95
FT HELIX 96 96
FT TURN 97 104
FT HELIX 106 107
FT TURN 110 115
FT STRAND 117 119
FT TURN 120 121
FT HELIX 123 131
FT TURN 132 133
FT HELIX 139 148
FT TURN 149 150
FT STRAND 153 156
FT TURN 159 161
FT TURN 163 164
FT HELIX 165 177
SQ SEQUENCE 192 AA; 21429 MW; 2A1F1366B07C3210 CRC64;

RAC2 HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 8838 ..
Found using 'seq23' (hayes346.key)

...
14 VGKTCLLISYTTNAPGEVPTVFDNYSANVMWDSKPNVLGWDTAGQEDYDRLEPLSLP
64 67

74 QTDVFLICFSLSPASVYENVRKWPFEVRHHCPSTPIILVGTKLDRDDKDTIEKLKKK
90 93

134 LAPITYPQGL

2 matches found in sequence:

rac2mouse ; Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (EN-7 protei
(from "bt_sp.pep")
TOIG of: rac2_mouse check: 9059 from: 1 to: 192

ID RAC2_MOUSE STANDARD; PRT; 192 AA.
AC Q05144; Q0D8X9;
DT 01-FEB-1994 (Rel. 28, Created)
DT 01-FEB-1994 (Rel. 28, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 2 (p21-Rac2) (EN-7 protein).
GN RAC2
OS Mus musculus (Mouse).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
OX NCBI TaxID=10090;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=90265620; PubMed=2189110;
RA Shirsat N.V., Pignolo R.J., Kreider B.L., Rovera G.;
RT "A member of the ras gene superfamily is expressed specifically in T,
RT B and myeloid hemopoietic cells.";
RL Oncogene 5:769-772(1990).
RN [2]
RP SEQUENCE FROM N.A.

RC STRAIN=C57BL/6J; TISSUE=Pancreas;
RX MEDLINE=21085660; PubMed=11217851;
RA Kawai J., Shinagawa A., Shibata K., Yoshino M., Itoh M., Ishii Y.,
RA Arakawa T., Hara A., Fukunishi Y., Konno H., Adachi J., Fukuda S.,
RA Aizawa K., Izawa M., Nishi K., Kiyosawa H., Kondo S., Yamanaka I.,
RA Saito T., Okazaki Y., Gojobori T., Bono H., Kasukawa T., Saito R.,
RA Kadota K., Matsuda H.A., Ashburner M., Batalov S., Casavant T.,
RA Fleischmann W., Gaasterland T., Gissi C., King B., Kochiwa H.,
RA Kuehl P., Lewis S., Matsuo Y., Nikaide I., Pesole G., Quackenbush J.,
RA Schiraldi L.M., Scaubli F., Suzuki R., Tomita M., Wagner L., Washio T.,
RA Sakai K., Okido T., Furuno M., Aono H., Baldarelli R., Barsh G.,
RA Blake J., Boffelli D., Bojunga N., Carninci P., de Bonaldo M.F.,
RA Brownstein M.J., Bult C., Fletcher C., Fujita M., Gariboldi M.,
RA Gustincich S., Hill D., Hofmann M., Hume D.A., Kamiya M., Lee N.H.,
RA Lyons P., Marchionni L., Mashima J., Mazzarelli J., Mombaerts P.,
RA Nordone P., Ring B., Ringwald M., Rodriguez I., Sakamoto N.,
RA Sasaki H., Sato K., Schoenbach C., Seya T., Shibata Y., Storch K.-F.,
RA Suzuki H., Toyooka K., Wang K.H., Weitz C., Whittaker C., Wilming L.,
RA Wynshaw-Boris A., Yoshida K., Hasegawa Y., Kawaji H., Kohtsuki S.,
RA Hayaishizaki Y.;
RT "Functional annotation of a full-length mouse cDNA collection.";
RL Nature 409:685-690(2001).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=C57BL/6J; TISSUE=Mammary gland;
RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg H., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullaly S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Vallaloon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahy J., Helton E., Kettelman M., Madan A., Rodriguez S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butlerfield Y.S.N., Krzyzanski M.I., Skaleka U., Smalley D.E.,
RA Schnurch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
CC -1- FUNCTION: Plasma membrane-associated small GTPase which cycles
CC between an active GTP-bound and inactive GDP-bound state. In active
CC state binds to a variety of effector proteins to regulate cellular
CC responses, such as secretory processes, phagocytosis of apoptotic
CC cells and epithelial cell polarization. Seems to be involved in
CC the regulation of the NaPPH oxidase.
CC -1- ENZYME REGULATION: Regulated by guanine nucleotide exchange
CC factors (GEFs) which promote the exchange of bound GDP for free
CC GTP. GTPase activating proteins (GAPs) which increase the GTP
CC hydrolysis activity, and GDP dissociation inhibitors which
CC inhibit the dissociation of the nucleotide from the GTPase.
CC -1- SUBUNIT: Interacts with DOCK2, which may activate it (By
CC similarity).
CC -1- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -1- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC the European Bioinformatics Institute. There are no restrictions on its
CC use by non-profit institutions as long as its content is in no way
CC modified and this statement is not removed. Usage by and for commercial
CC entities requires a license agreement (See <http://www.isb-sib.ch/announce/>
CC or send an email to license@sib-sib.ch)
CC
CC EMBL; X53247; CAA37337.1; -.
CC EMBL; AK007561; BAB25109.1; -.

DR EMBL; BC005455; AAH05455.1; -.
DR PIR; A60194; A60194.
DR HSP; P15153; 1DS6.
DR MGD; MGI:97846; Rac2.
DR InterPro; IPR003578; GTPase_Rho.
DR InterPro; IPR001806; Ras_trnsmng.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASTNSFRMG.
DR SMART; SM00174; RHO; 1.
DR TIGRFAMs; TIGR00231; small GTP; 1.
KW GTP-binding; Prenylation; Lipoprotein.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine
FT (By similarity).
FT CONFLICT 60 60 G -> V (IN REF. 2).
FT SEQUENCE 192 AA; 21441 MW; 2A1FL266AB9D7705 CRC64;
RAC2 MOUSE Length: 192 September 1, 2004 07:06 Type: P Check: 9059
Found using 'seq23' (hayes346.key)
...
14 VGKTCLLISYTNAPGGEYIPFDNYSANVMVDSKPNVLGLWDTAGQDYDLRLPLSP
64 57
74 QTDVFLICFSLVSPASVENRWKPFVRHHCPSPIILVGTGLDLRDDKDTIEKLKEK
90 93
134 LAPITYPQGL
...

2 matches found in sequence:
racshuman; Ras-related C3 botulinum toxin substrate 3 (p21-Rac3).
(from "bc_sp.pep")
TOIG of: rac3_human check: 8517 from: 1 to: 192
ID RAC3 HUMAN STANDARD; PRT; 192 AA.
AC O14658;
DT 15-JUL-1998 (Rel. 36, Created)
DT 15-JUL-1998 (Rel. 36, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related C3 botulinum toxin substrate 3 (p21-Rac3).
GN RAC3.
OS Homo sapiens (Human), and
OS Mus musculus (Mouse).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606, 10090;
RN [1]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RX MEDLINE=97400509; PubMed=9252344;
RA Haataja L., Groffen J., Heisterkamp N.;
RT "Characterization of RAC3, a novel member of the Rho family.";
RL J. Biol. Chem. 272:20384-20388(1997).
RN [2]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RA Puhl H.L. III, Ikeda S.R., Aronstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RT sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RC SPECIES=Human; TISSUE=Brain;

```

RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins F.S., Wegner L., Shennen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
RA Stapleton M.J., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullany S.J.,
RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
RA Fahey J., Helton E., Kettelman M., Madan A., Rodrigues S., Sanchez A.,
RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smalilus D.E.,
RA Schnerch A., Schein J.E., Jones S.J.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
RN [4]
RP SEQUENCE FROM N.A.
RC SPECIES=Mouse;
RA Koga H., Sumimoto H.;
RT "mouse Rac3.";
RL Submitted (MAR-2000) to the EMBL/GenBank/DBJ databases.
CC -!- FUNCTION: MAY PLAY A ROLE IN INTRACELLULAR SIGNALING.
CC -!- SUBCELLULAR LOCATION: Cytoplasmic; membrane-associated when
CC activated (By similarity).
CC -!- TISSUE SPECIFICITY: HIGHEST LEVELS IN BRAIN, ALSO DETECTED IN
CC HEART, PLACENTA, AND PANCREAS.
CC -!- INDUCTION: EXPRESSION DOWN-REGULATED IN QUIESCENT FIBROBLASTS AND
CC CLEARLY INDUCED BY SERUM STIMULATION.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; AF008591; AAC51667.1; -
CC EMBL; AF498966; AA021113.1; -
CC EMBL; BC009605; AA09605.1; -
CC EMBL; BC015197; AA015197.1; -
CC EMBL; AB040819; BAB40573.1; -
CC HSSP; P15154; 1MH1.
CC Genew; HGNC:9803; Rac3.
CC MIM; 602050; -
CC MGD; MGI:2180784; Rac3.
CC GO; GO:0003924; GTPase activity; TAS.
CC GO; GO:0007242; P:intracellular signaling cascade; TAS.
CC InterPro; IPR003578; GTPase Rho.
CC InterPro; IPR001806; Ras trnsfrmng.
CC InterPro; IPR005225; Small_GTP.
CC Pfam; PF00071; ras; 1.
CC PRINTS; PR00449; RASTRNSFRMNG.
CC SMART; SM00174; RHO; 1.
CC TIGRfams; TIGR00231; small GTP; 1.
CC KW GTP-binding; Prenylation; Lipoprotein; Polymorphism.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine.
FT VARIAT 14 14 V -> A (in dbSNP:5833).
FT VARIANT 27 27 A -> T (in dbSNP:5824).
FT VARIANT 29 29 P -> S (in dbSNP:5827).
FT SEQUENCE 192 AA; 21379 MW; 560BHC26BH7CDF4A CRC64;

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Found using 'seq23' (hayes346.key)
 Rec3_HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 8517

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...
14 VGKTCLLSYTTNAPGQYIPTVFDNYSANVMVDGKPVNLGLWDTAGQEDYDRLRPLSY
|---|
64 67

74 QTDVFLICFLSPASFPENVRKRVKVEVRHCHPHTPIILVGTGLKLDLDDKDTIERLDDKK
|---|
98 101

134 LAPITYQGLAMAREIGS
...

3 matches found in sequence:
rac3human ; Ras-related C3 botulinum toxin substrate homolog DJ20J23.1.
(from "bt_sp.pep")
TOIG of: rac3_human check: 6409 from: 1 to: 192

ID RACX HUMAN STANDARD; PRT; 192 AA.
AC O95916;
DT 16-OCT-2001 (Rel. 40, Created)
DT 16-OCT-2001 (Rel. 40, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Ras-related C3 botulinum toxin substrate homolog DJ20J23.1.
OS Homo sapiens (Human)
OC Eukaryota; Metazoa; Chordata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606;
RN [1]
RP SEQUENCE FROM N.A.
RA Pearce A.;
RL Submitted (JUL-1998) to the EMBL/GenBank/DBJ databases.
CC -!- FUNCTION: RACS ARE PLASMA MEMBRANE-ASSOCIATED GTP-BINDING PROTEINS
CC WHICH COULD REGULATE SECRETORY PROCESSES, PARTICULARLY IN MYELOID
CC CELLS (BY SIMILARITY).
CC -!- SUBCELLULAR LOCATION: Inner surface of plasma membrane possibly
CC with attachment requiring acylation of the C-terminal cysteine (By
CC similarity with RAS).
CC -!- SIMILARITY: Belongs to the small GTPase superfamily. Rho family.
CC
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CC or send an email to license@isb-sib.ch).
CC
CC EMBL; AL022576; -; NOT_ANNOTATED_CDS.
CC HSSP; P15154; 1MH1.
CC InterPro; IPR003578; GTPase Rho.
CC InterPro; IPR001806; Ras trnsfrmng.
CC InterPro; IPR005225; Small_GTP.
CC Pfam; PF00071; ras; 1.
CC PRINTS; PR00449; RASTRNSFRMNG.
CC SMART; SM00174; RHO; 1.
CC TIGRfams; TIGR00231; small GTP; 1.
CC KW GTP-binding; Prenylation; Lipoprotein; Polymorphism.
FT NP_BIND 10 17 GTP (BY SIMILARITY).
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 115 118 GTP (BY SIMILARITY).
FT DOMAIN 32 40 EFFECTOR REGION (POTENTIAL).
FT LIPID 189 189 S-geranylgeranyl cysteine.
FT VARIAT 14 14 V -> A (in dbSNP:5833).
FT VARIANT 27 27 A -> T (in dbSNP:5824).
FT VARIANT 29 29 P -> S (in dbSNP:5827).
FT SEQUENCE 192 AA; 21383 MW; 09C5DFE64C8B6053 CRC64;

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RACX HUMAN Length: 192 September 1, 2004 07:06 Type: P Check: 6409 ..
Found using 'seq23' (hayes346.key)

...
14 VGKTCLLISYTTNAFGEDIPTAFDNYNSANVMVDGKLVNGLWNTAGQEDYDRRLPLSY -
64 67 72

74 QADVFLICFLSPASFNVLAKWYEVQHHCNTPILVGTGLDLRDKDRIQKLKKEK -
75 98 101

134 LTPITYPOGLAMAKEMGA

...

2 matches found in sequence:
rapahuman; Ras-related protein Rap-1A (C21KG) (KREV-1 protein) (GTP-binding
from "bc_sp.pep")
TOIG of: rapa_human check: 7493 from: 1 to: 184

ID RAPA HUMAN STANDARD; PRT; 184 AA.
AC P10113;
DT 01-MAR-1989 (Rel. 10, Created)
DT 01-MAR-1989 (Rel. 10, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE Ras-related protein Rap-1A (C21KG) (KREV-1 protein) (GTP-binding
DE protein SMG-P21A) (G-22K).
GN RAP1A OR KREV1.
OS Homo sapiens (Human),
OS Mus musculus (Mouse),
OS Rattus norvegicus (Rat), and
OS Bos taurus (Bovine).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX NCBI_TaxID=9606, 10090, 10116, 9913;
RN [1]
RN [2]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RX MEDLINE=88319657; PubMed=3045729;
RA Pizon V., Chardin P., Lerosey I., Olofsson B., Tavittian A.;
RT "Human cDNAs rap1 and rap2 homologous to the Drosophila gene Dras3
RT encode proteins closely related to ras in the 'effector' region.";
RL Oncogene 3:201-204(1988).
RN [2]
RP REVISION TO 3.
RC SPECIES=Human;
RX Pizon V.;
RA Submitted (FEB-1989) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RC SPECIES=Human; TISSUE=Brain;
RX Puhl H.L. III, Ikeda S.R., Atonstam R.S.;
RT "cDNA clones of human proteins involved in signal transduction
RT sequenced by the Guthrie cDNA resource center (www.cdna.org).";
RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
RN [4]
RP SEQUENCE FROM N.A.
RC SPECIES=Human;
RX Coville G.;
RA Submitted (SEP-1999) to the EMBL/GenBank/DBJ databases.
RN [5]
RP SEQUENCE FROM N.A.
RC SPECIES=Human; TISSUE=Skin;
RX MEDLINE=22388257; PubMed=12477932;
RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
RA Klausner R.D., Collins P.S., Wagner L., Shenmen C.M., Schuler G.D.,
RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,

Stapleton M., Soares M.B., Ronaldo M.F., Casavant T.L., Scheetz T.E.,
Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,
Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullaly S.J.,
Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
Fahey J., Helton E., Kettaman M., Madan A., Rodrigues S., Sanchez A.,
Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smilus D.E.,
Schnerch A., Schein J.E., Jones S.U.M., Marra M.A.;
RT "Generation and initial analysis of more than 15,000 full-length
RT human and mouse cDNA sequences.";
RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
RN [6]
RP PARTIAL SEQUENCE.
RC SPECIES=Human; TISSUE=Platelet;
RX MEDLINE=9000849; PubMed=2507536;
RA Nagata K.-I., Itoh H., Katada T., Takenaka K., Ui M., Kaziro Y.,
Nozawa Y.;
RT "Purification, identification, and characterization of two
RT GTP-binding proteins with molecular weights of 25,000 and 21,000 in
RT human platelet cytosol. One is the rap1/smg21/Krev-1 protein and the
RT other is a novel GTP-binding protein.";
RL J. Biol. Chem. 264:17000-17005(1989).
RN [7]
RP SEQUENCE OF 1-35.
RC SPECIES=Human;
RX MEDLINE=89034164; PubMed=3141412;
RA Bokoch G.M., Parkos C.A., Mumby S.M.;
RT "Purification and characterization of the 22,000-dalton GTP-binding
RT protein substrate for ADP-ribosylation by botulinum toxin, G22K.";
RL J. Biol. Chem. 263:16744-16749(1988).
RN [8]
RP SEQUENCE OF 1-5; 17-24; 32-42 AND 152-168.
RC SPECIES=Human;
RX MEDLINE=89076301; PubMed=3144274;
RA Omori T., Kikuchi A., Yamamoto K., Kawata M., Kondo J., Takai Y.;
RT "Identification of a platelet Mr 22,000 GTP-binding protein as the
RT novel smg-21 gene product having the same putative effector domain as
RT the ras gene products.";
RL Biochem. Biophys. Res. Commun. 157:670-676(1988).
RN [9]
RP SEQUENCE FROM N.A.
RC SPECIES=Mouse;
RX Strausberg R.;
RA Submitted (JUL-2001) to the EMBL/GenBank/DBJ databases.
RN [10]
RP SEQUENCE FROM N.A.
RC SPECIES=Rat;
RX MEDLINE=89089760; PubMed=2642744;
RA Kitayama H., Sugimoto Y., Matsuzaki T., Ikawa Y., Noda M.;
RT "A ras-related gene with transformation suppressor activity.";
RL Cell 56:77-84(1989).
RN [11]
RP SEQUENCE FROM N.A.
RC SPECIES=Bovine;
RX MEDLINE=89066693; PubMed=3143720;
RA Kawata M., Matsui Y., Kondo J., Hishida T., Teranishi Y., Takai Y.;
RT "A novel small molecular weight GTP-binding protein with the same
RT putative effector domain as the ras proteins in bovine brain
RT membranes. Purification, determination of primary structure, and
RT characterization.";
RL J. Biol. Chem. 263:18965-18971(1988).
RN [12]
RP ISOPRENOID.
RX MEDLINE=91141501; PubMed=1899909;
RA Buss J.E., Quilliam L.A., Kato K., Casey P.J., Soltski P.A., Wong G.,
RA Clark R., McCormick F., Bokoch G.M., Der C.J.;
RT "The COOH-terminal domain of the Rap1A (Krev-1) protein is
RT isoprenylated and supports transformation by an H-Ras:Rap1A chimeric
RT protein.";

RL Mol. Cell. Biol. 11:1523-1530 (1991).
RN [13]
RP X-RAY CRYSTALLOGRAPHY (2.2 ANGSTROMS) OF 1-167.
RX MEDLINE=95312074; PubMed=7791872;
RA Nassar N., Horn G., Herrmann C., Scherer A., McCormick F.,
RA Wittinghofer A.;
RT "The 2.2 A crystal structure of the Ras-binding domain of the
RT serine/threonine kinase c-Raf1 in complex with Rap1A and a GTP
RT analogue.";
RL Nature 375:554-560 (1995).
RN [14]
RP X-RAY CRYSTALLOGRAPHY (2.0 ANGSTROMS) OF 1-167.
RX MEDLINE=96313130; PubMed=8756332;
RA Nassar N., Horn G., Herrmann C., Block C., Janknecht R.,
RA Wittinghofer A.;
RT "Ras/Rap effector specificity determined by charge reversal.";
RL Nat. Struct. Biol. 3:723-729 (1996).
CC -!- FUNCTION: Induces morphological reversion of a cell line
CC transformed by a Ras oncogene. Counteracts the mitogenic function
CC of Ras, at least partly because it can interact with Ras GAPs and
CC RAF in a competitive manner.
CC -!- ENZYME REGULATION: Activated by guanine nucleotide-exchange
CC factors (GEF) EPAC and EPAC2 in a GTP-dependent manner, and GFR.
CC -!- SUBCELLULAR LOCATION: Membrane-bound.
CC -!- SIMILARITY: Belongs to the small GTPase superfamily, Ras family.
CC -!- DATABASE: NAME=Atlas Genet. Cytogenet. Oncol. Haematol.;
CC WWW="http://www.infobiogen.fr/services/chromancer/Genes/RAP1AID272.html".
CC -----
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CC -----
DR EMBL; X12533; CAA31051.1; -;
DR EMBL; M22995; AAA36150.1; -;
DR EMBL; AF493912; AAM12626.1; -;
DR EMBL; AL049557; CAB55685.1; -;
DR EMBL; BC014086; AAH14086.1; -;
DR EMBL; BC011105; AAH11105.1; -;
DR EMBL; J04196; AAA30415.1; -;
DR EMBL; A08691; CAA00804.1; -;
DR PIR; A31961; A31961.
DR PIR; A32342; A32342.
DR PDB; 1GUA; 11-JAN-97.
DR PDB; 1CLY; 08-NOV-00.
DR Genew; HGNC:9855; RAP1A.
DR MIM; 179520; -; Rap1a.
DR MGO; MGI:97852; Rap1a.
DR GO; GO:0003924; P:GTPase activity; TAS.
DR GO; GO:0000074; P:regulation of cell cycle; TAS.
DR GO; GO:0007165; P:signal transduction; TAS.
DR InterPro; IPR003577; GTPase_Ras.
DR InterPro; IPR001806; Ras_tnsfrmg.
DR InterPro; IPR005225; Small_GTP.
DR Pfam; PF00071; ras; 1.
DR PRINTS; PR00449; RASRNSFRMG.
DR SMART; SM00173; RAS; 1.
DR TIGRfam; TIGR00231; small GTP; 1.
KW GTP-binding; Prenylation; Anti-oncogene; 3D-structure.
FT CHAIN 1 181
FT PROPEP 182 184 RAS-RELATED PROTEIN RAP-1A.
FT NP_BIND 10 17 REMOVED IN MATURE FORM.
FT NP_BIND 57 61 GTP (BY SIMILARITY).
FT NP_BIND 116 119 GTP (BY SIMILARITY).
FT DOMAIN 32 40 GTP (BY SIMILARITY).
FT LIPID 181 181 EFFECTOR REGION (PROBABLE).
FT STRAND 3 9 S-ganylglyceranyl cysteine.
FT TURN 12 13
FT HELIX 16 25

FT STRAND 37 46
FT TURN 47 48
FT STRAND 49 57
FT TURN 66 67
FT HELIX 68 74
FT STRAND 77 83
FT TURN 84 85
FT HELIX 87 91
FT TURN 92 92
FT HELIX 93 104
FT TURN 105 105
FT STRAND 111 116
FT TURN 118 119
FT HELIX 121 123
FT HELIX 128 137
FT TURN 138 140
FT STRAND 142 145
FT STRAND 147 147
FT TURN 148 151
FT STRAND 152 152
FT HELIX 154 165
SQ SEQUENCE 184 AA; 20987 MW; 42C39290C98E0A92 CRC64;
RAPA HUMAN Length: 184 September 1, 2004 07:06 Type: P Check: 7493
Pound using 'seq23' (hayes346.key)
1 MREYKLVILGSGVGKSAITVQVGIFVEKYDPTIEDSYRQKVEVDCQCQMLEILD
4 7
...
109 VPMILVGNKCDLEDERVVGKQGNLQRCWNCAPLESKSKINWEIFYDLVRQINRK
159
169 TPVEKKPKKXSCILL

2 matches found in sequence:
sn33arath; SNAP25 homologous protein SNAP33 (AtSNAP33) (Synaptosomal-associat
(from "bt_sp.pep")
ToIG of: sn33_arath check: 8029 from: 1 to: 300
ID SN33 ARATH STANDARD; PRT; 300 AA.
AC Q9S7P9;
DT 28-FEB-2003 (Rel. 41, Created)
DT 28-FEB-2003 (Rel. 41, Last sequence update)
DT 15-MAR-2004 (Rel. 43, Last annotation update)
DE SNAP25 homologous protein SNAP33 (AtSNAP33) (Synaptosomal-associat
DE protein SNAP25-like 1) (SNAP-25 like protein 1) (Snap25a).
GN SNAP33 OR SNAP33B OR AT5G61210 OR MAF19 210 OR MAF19.2.
OS Arabidopsis thaliana (Mouse-ear cress).
OC Eukaryota; Viridiplantae; Streptophyta; Embryophyta; Tracheophyta;
OC Spermatophyta; Magnoliophyta; eudicotyledons; core eudicots; rosids;
OC euroids II; Brassicales; Brassicaceae; Arabidopsiis.
OX NCBI_TaxID=3702;
RN [1]
RP SEQUENCE FROM N.A., AND CHARACTERIZATION
RC STRAIN=cv. Landsberg erecta, and cv. Columbia;
RX MEDLINE=21490313; PubMed=11591731;
RA Heese M., Gansel X., Sticher L., Wick P., Grebe M., Granier F.,
RA Juergens G.;
RT "Functional characterization of the KNOLLE-interacting t-SNARE
RT AtSNAP33 and its role in plant cytokinesis.";
RN J. Cell Biol. 155:239-249 (2001).
[2]
RP SEQUENCE FROM N.A.
RC STRAIN=cv. Columbia;
RX MEDLINE=98069011; PubMed=9405937;
RA Kotani H., Nakamura Y., Sato S., Kaneko T., Asamizu E., Miyajima N.,
RA Tabata S.;
RT "Structural analysis of Arabidopsis thaliana chromosome 5. II.

RT Sequence features of the regions of 1,044,062 bp covered by thirteen
RT physically assigned pl clones.;
RL DNA Res. 4:291-300(1997).
RN [3]
RC SEQUENCE FROM N.A.
RX STRAIN=cv. Columbia;
RX MEDLINE=22954850; PubMed=14593172;
RA Yamada K., Lim J., Dale J.M., Chen H., Shinn P., Palm C.J., Cheuk R.F.,
RA Southwick A.M., Wu H.C., Kim C.J., Nguyen M., Pham P.K., Cheuk R.F.,
RA Karlins-Newmann G., Liu S.X., Lam B., Sakano H., Wu T., Yu G.,
RA Miranda M., Quach H.L., Tripp M., Chang C.H., Lee J.M., Toriumi M.J.,
RA Chan M.M., Tang C.C., Onodera C.S., Deng J.M., Akiyama K., Ansari Y.,
RA Arakawa T., Banh J., Banno F., Bowser L., Brooks S.Y., Carninci P.,
RA Chao Q., Choy N., Enju A., Goldsmith A.D., Gurjal M., Hansen N.F.,
RA Hayashizaki Y., Johnson-Hopson C., Hsuan V.W., Iida K., Karnes M.,
RA Khan S., Koesema E., Ishida J., Jiang P.X., Jones T., Kawai J.,
RA Kamiya A., Meyers C., Nakajima M., Narusaka M., Seki M., Sakurai T.,
RA Satou M., Tamse R., Vaysberg M., Wallender E.K., Wong C., Yamamura Y.,
RA Yuan S., Shinozaki K., Davis R.W., Theologis A., Ecker J.R.;
RT "Empirical analysis of transcriptional activity in the Arabidopsis
RT genome".
RL Science 302:842-846(2003).
RN [4]
RC SEQUENCE FROM N.A.
RA Brover V., Troukhan M., Alexandrov N., Lu Y.-P., Flavell R.,
RA Feldmann K.A.;
RT "Full-length cDNA from Arabidopsis thaliana".
RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
RN [5]
RC CHARACTERIZATION, AND INTERACTION WITH KNOLLE AND SYP121.
RX MEDLINE=21576055; PubMed=11718726;
RA Kargul J., Gansel X., Tyrrell M., Sticher L., Blatt M.R.;
RT "Protein-binding partners of the tobacco syntaxin Nt-Syrl.;"
RL FEBS Lett. 508:253-258(2001).
RN [6]
RC INDUCTION.
RX MEDLINE=22631601; PubMed=12746539;
RA Wick P., Gansel X., Oulevey C., Page V., Studer I., Durst M.,
RA Sticher L.;
RT "The expression of the t-SNARE AtSNAP33 is induced by pathogens and
RT mechanical stimulation.";
RL Plant Physiol. 132:343-351(2003).
CC -I- FUNCTION: T-SNARE involved in diverse vesicle trafficking and
CC membrane fusion processes, including cell plate formation. May
CC function in the secretory pathway.
CC -I- SUBUNIT: Interacts with the cytokinesis-specific syntaxin KNOLLE
CC and with SYP121.
CC -I- SUBCELLULAR LOCATION: Membrane-associated. Plasma membrane, some
CC endomembrane compartment and cell plate in dividing cells.
CC -I- TISSUE SPECIFICITY: Ubiquitous, with a strong expression in root
CC tips, ovules, very young leaves, vascular tissue, hydathodes,
CC stipules and the abscission and dehiscence zones of the silicles.
CC -I- INDUCTION: Locally and systemically induced by pathogen infection
CC and locally only by mechanical stresses.
CC -I- MISCELLANEOUS: Specifically cleaved by the botulinum neurotoxins
CC BotN/A and BotN/E.
CC -I- SIMILARITY: Belongs to the SNAP-25 family.
CC -I- SIMILARITY: Contains 1 t-SNARE coiled-coil homology domain.
CC
CC This SWISS-PROT entry is copyright. It is produced through a collaboration
CC between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC the European Bioinformatics Institute. There are no restrictions on its
CC use by non-profit institutions as long as its content is in no way
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CC or send an email to license@isb-sib.ch).
CC
CC -----
CC EMBL; X92420; CAB52583.1; --
CC EMBL; X92419; CAB52582.1; --
CC EMBL; Y13198; CAC79615.1; --
CC EMBL; AB006696; BAB10383.1; --
CC EMBL; AY057627; AAL15258.1; --
CC EMBL; AY141994; AAM98258.1; --

DR EMBL; AY085322; AAM62553.1; --
DR InterPro; IPR000928; SNAP-25.
DR InterPro; IPR000727; T-SNARE.
DR Pfam; PF00835; SNAP-25; 1.
DR Pfam; PF05739; SNARE; 1.
DR PROSITE; PS0192; T-SNARE; 1.
KW Cell cycle; Cell division; Transport; Protein transport; Membrane;
KW Coiled coil; Multigene family.
FT DOMAIN 235 297 T-SNARE COILED-COIL HOMOLOGY.
SQ SEQUENCE 300 AA; 33644 MW; 685A0484608C6DE7 CRC64;
SN33 ARATH length: 300 September 1, 2004 07:06 Type: P Check: 8029 ..
Found using 'seq23' (have6346.key)
...
54 MTNPFQGERVQKQSSSSKQSLFSNSKYQYKNNFRSGGIENOSVQLEGYAVYKABETT
104
114 KSYQGCLKVAEDIRSDATRLVMLHDQGEQITRTHKAVEIDHD
...
181 TRPFGPVVTRDDSPTRRVNHLEKREKLGNSAPRGQSTRFPLPESADAYQVWEKAK
231
241 QDDGLSDLSILGELKNMVDGMGSEIEKQNKGLDHLHDDVDDELN
...

28 matches found in sequence:
tetxclote; Tetanus toxin precursor (EC 3.4.24.68) (Tentoxylisin) [Contains:
TOIG of: tetx_clote check: 5503 from: 1 to: 1314
ID TETX_CLOTE STANDARD; PRT; 1314 AA.
AC P04958;
DT 13-AUG-1987 (Rel. 05, Created)
DT 13-AUG-1987 (Rel. 05, Last sequence update)
DT 10-OCT-2003 (Rel. 42, Last annotation update)
DE Tetanus toxin precursor (EC 3.4.24.68) (Tentoxylisin) [Contains:
DE Tetanus toxin light chain (Tetanus toxin chain L); Tetanus toxin heavy
DE chain (Tetanus toxin chain H)].
DE TETX OR CTP60.
GN Clostridium tetani.
OS Plasmid pE88, and plasmid 75 Kbp.
OG Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1513;
RN [1]
RP SEQUENCE FROM N.A.
RC PLASMID=75 Kbp;
RX MEDLINE=87053814; PubMed=3536478;
RA Eisel U., Jarausch W., Goratzki K., Henschen A., Engels J.,
RA Weller U., Hudel M., Habermann E., Niemann H.;
RT "Tetanus toxin: primary structure, expression in E. coli, and
RT homology with botulinum toxins.";
RL EMBO J. 5:2495-2502(1986).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=CN3911; PLASMID=75 Kbp;
RX MEDLINE=87040747; PubMed=3774547;
RA Fairweather N.F., Lyness V.A.;
RT "The complete nucleotide sequence of tetanus toxin.";
RL Nucleic Acids Res. 14:7809-7812(1986).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=Massachusetts / E88; PLASMID=pE88;
RX MEDLINE=22457253; PubMed=12552129;
RA Brueggemann H., Baeumer S., Fricke W.F., Wierze A., Liesegang H.,

RA Decker I., Herzberg C., Martinez-Arias R., Merkl R., Henne A.,
RA Gottschalk G.;
RT "The genome sequence of Clostridium tetani, the causative agent of
RT tetanus disease.";
RL Proc. Natl. Acad. Sci. U.S.A. 100:1316-1321(2003).
RN [4]
RP SEQUENCE OF 742-1314 FROM N.A.
RC PLASMID=75 Kbp;
RX MEDLINE=86085672; PubMed=3510187;
RA Fairweather N.F., Lyness V.A., Pickard D.J., Allen G., Thomson R.O.;
RT "Cloning, nucleotide sequencing, and expression of tetanus toxin
RT fragment C in Escherichia coli.";
RL J. Bacteriol. 165:21-27(1986).
RN [5]
RP PARTIAL SEQUENCE, AND DISULFIDE BONDS.
RX MEDLINE=90201034; PubMed=2108021;
RA Krieglstein K., Henschen A., Weller U., Habermann E.;
RT "Arrangement of disulfide bridges and positions of sulfhydryl groups
RT in tetanus toxin.";
RL Eur. J. Biochem. 188:39-45(1990).
RN [6]
RP PARTIAL SEQUENCE.
RX MEDLINE=92037649; PubMed=1935979;
RA Krieglstein K.G., Henschen A.H., Weller U., Habermann E.;
RT "Limited proteolysis of tetanus toxin. Relation to activity and
RT identification of cleavage sites.";
RL Eur. J. Biochem. 202:41-51(1991).
RN [7]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=93063293; PubMed=1331807;
RA Schiavo G., Benfenati F., Poulain B., Rossetto O., de Laureto P.P.,
RA Montecucco C.;
RT "Tetanus and botulinum-B neurotoxins block neurotransmitter release
RT by proteolytic cleavage of synaptobrevin.";
RL Nature 359:832-835(1992).
RN [8]
RP IDENTIFICATION OF SUBSTRATE.
RX MEDLINE=93063293; PubMed=1331807;
RA Schiavo G., Benfenati F., Poulain B., Rossetto O., de Laureto P.P.,
RA Montecucco C.;
RT "Tetanus and botulinum-B neurotoxins block neurotransmitter release
RT by proteolytic cleavage of synaptobrevin.";
RL Nature 359:832-835(1992).
RN [9]
RP X-RAY CRYSTALLOGRAPHY (2.7 ANGSTROMS) OF 874-1314.
RX MEDLINE=97475217; PubMed=9334741;
RA Umland T.C., Wingert L.M., Swaminathan S., Furey W.F., Schmidt J.J.,
RA Sax M.;
RT "Structure of the receptor binding fragment HC of tetanus
RT neurotoxin.";
RL Nat. Struct. Biol. 4:788-792(1997).
CC -!- FUNCTION: TETANUS TOXIN ACTS BY INHIBITING NEUROTRANSMITTER
CC RELEASE. IT BINDS TO PERIPHERAL NEURONAL SYNAPSES, IS INTERNALIZED
CC AND MOVES BY RETROGRADE TRANSPORT UP THE AXON INTO THE SPINAL CORD
CC WHERE IT CAN MOVE BETWEEN POSTSYNAPTIC AND PRESYNAPTIC NEURONS. IT
CC INHIBITS NEUROTRANSMITTER RELEASE BY ACTING AS A ZINC
CC ENDOPEPTIDASE THAT CATALYZES THE HYDROLYSIS OF THE 76-GLN-|-PHE-77
CC BOND OF SYNAPTOSOMAL-2.
CC -!- CATALYTIC ACTIVITY: Hydrolysis of 76-Gln-|-Phe-77 bond in
CC synaptobrevin 2.
CC -!- COFACTOR: Binds 1 zinc ion per subunit (By similarity).
CC -!- SUBUNIT: THE PRECURSOR POLYPEPTIDE IS SUBSEQUENTLY CLEAVED TO
CC YIELD SUBCHAINS L AND H. THESE REMAIN LINKED BY A DISULFIDE BRIDGE
CC AND ARE NON-TOXIC AFTER SEPARATION.
CC -!- MISCELLANEOUS: THE C-TERMINAL OF THE HEAVY CHAIN BINDS TO
CC GANGLIOSIDE RECEPTORS.
CC -!- SIMILARITY: Belongs to peptidase family M27.
CC -----
CC This SWISS-PROT entry is copyrighted. It is produced through a collaboration
CC between the Swiss Institute of Bioinformatics and the EMBL outstation -
CC the European Bioinformatics Institute. There are no restrictions on its
CC use by non-profit institutions as long as its content is in no way
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CC or send an email to license@isb-sib.ch).
CC -----
CC EMBL; X04436; CAA28033.1; -;
CC EMBL; X06214; CAA29564.1; -;
CC DR EMBL; AF528097; AAO37454.1; -;
CC EMBL; M12739; AAA23282.1; -;
CC DR PIR; A25689; BTCLTN.
CC DR PDB; 1AF9; 29-APR-98.
CC DR PDB; 1A8D; 14-OCT-98.
CC DR PDB; 1DOH; 27-MAR-00.
CC DR PDB; 1DFQ; 24-MAR-00.
CC DR PDB; 1DIW; 24-MAR-00.
CC DR PDB; 1DLL; 24-MAR-00.
CC DR PDB; 1FV3; 05-SEP-01.
CC DR MEROPS; M27.001; -;
CC DR InterPro; IPR008985; ConA like lec.gl.
CC DR InterPro; IPR002160; Kunitz legume.
CC DR InterPro; IPR006025; Pept_M Zn BS.
CC DR InterPro; IPR000395; Peptidase M27.
CC DR Pfam; PF01742; Peptidase M27; 1.
CC DR PRINTS; PR00760; BONTOXILYSIN.
CC DR ProDom; PD001963; Bontoxilysin; 1.
CC DR PROSITE; PS00142; ZINC_PROTEASE; 1.
CC DR Neurotoxin; Transmembrane; Hydrolase; Metalloprotease; Zinc; Plasmid;
CC 3D-structure; Complete; proteome.
CC INIT MET 0 0
CC CHAIN 1 456 TETANUS TOXIN LIGHT CHAIN.
CC CHAIN 457 1314 TETANUS TOXIN HEAVY CHAIN.
CC FT CHAIN 232 232 ZINC (CATALYTIC) (BY SIMILARITY).
CC FT METAL 233 233 BY SIMILARITY.
CC FT ACT_SITE 236 236 ZINC (CATALYTIC) (BY SIMILARITY).
CC FT METAL 226 246 POTENTIAL.
CC FT TRANSMEM 669 689 POTENTIAL.
CC FT DISULFID 438 466 INTERCHAIN.
CC FT DISULFID 1076 1092
CC FT HELIX 876 882
CC FT TURN 883 883
CC FT STRAND 884 891
CC FT TURN 892 893
CC FT STRAND 894 897
CC FT STRAND 904 907
CC FT TURN 909 910
CC FT STRAND 912 915
CC FT STRAND 920 925
CC FT TURN 928 929
CC FT STRAND 932 935
CC FT HELIX 938 940
CC FT TURN 941 946
CC FT STRAND 949 956
CC FT HELIX 962 968
CC FT TURN 969 970
CC FT STRAND 972 977
CC FT STRAND 980 981
CC FT HELIX 983 985
CC FT STRAND 987 995
CC FT TURN 996 997
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CC FT TURN 1006 1007
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CC FT TURN 1021 1022
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CC FT TURN 1039 1040
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CC FT TURN 1048 1049
CC FT STRAND 1050 1056
CC FT TURN 1058 1059
CC FT STRAND 1068 1074
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CC FT STRAND 1082 1091
CC FT HELIX 1097 1105
CC FT TURN 1106 1107

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1112 1112 FT STRAND
1114 1114 FT STRAND
1117 1117 FT TURN
1120 1120 FT STRAND
1122 1122 FT STRAND
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1127 1131 FT STRAND
1132 1134 FT HELIX
1135 1136 FT TURN
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1144 1145 FT TURN
1148 1152 FT STRAND
1155 1158 FT STRAND
1159 1162 FT TURN
1163 1166 FT STRAND
1173 1178 FT STRAND
1184 1185 FT TURN
1188 1188 FT STRAND
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1191 1192 FT TURN
1193 1201 FT STRAND
1202 1203 FT TURN
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1218 1220 FT TURN
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1235 1236 FT STRAND
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1252 1257 FT STRAND
1263 1272 FT STRAND
1275 1276 FT TURN
1280 1286 FT STRAND
1287 1292 FT HELIX
1293 1294 FT TURN
1299 1300 FT TURN
1302 1305 FT STRAND
1308 1308 FT STRAND
1309 1310 FT TURN
1311 1311 FT STRAND
1314 1314 SQ SEQUENCE

TEX CLUTE Length: 1314 September 1, 2004 07:06 Type: P Check: 5503 ..
Found using 'seq23' (hayes346.key)

1 PITINNFRYSDPVNNDTIIMMEPPYCKGLDIYKAPKITDRIWIVPERYEGTKPEDFNP
  32 35
  33 36

61 PSSLIIGASEYDNPYLRTDSKDRFLQTMVKLENRIKNNVAGEALLDKIINAIPYLGNS

121 YSLIDKFDTHNSVSFNLLBQDPGATTKSAMLTNLIIFGPGPVINKNEVRGIV
  121

...

248 SHELIIPSKQELIYMQHTYPIABEELFTFGQDANLISIDIKNDLYEKTINDYKAIAKANKLSQ
  298

308 VTSCNDENIDIDSYKQYQKYQFQDKDSNGQYIVNEDKFQILYNSIMYGFTEIELGKKFN
  321
  350

368 IKTRLSYFSMNHDPVKIPNLLDDTIYNDTEGFNTESKDLSEYKGQNMVRNTNAFRNVGD
  374

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...
510 KIIVDYNLQSKITLPNDRTTPVTGIPYAPYKSNAASTIEIHNDNDNTIYQYLYAQKSP
  560
  562

570 TTLQRTMTNSVDDALINSTKIYSPFSPVSKVNOGAQGLFLQWRDIIDDFTNESSQK
  592

630 TTIDKISDVSTIVPYI

...

661 IGALETTGVVLLLEYIPEITLPVIAALSAESSTQKEKIIKTIDNLEKRYEKWIEYKIL
  711
  718

721 VKAKWLGTVNTQFQKRSYQMSLEYQVDAIKKIIDYEYKIYSGDPKEQIADEINNLKKN
  721
  738
  741

781 LEEKANKAMININIFMRESSRSFLVNQMINAEAKKQLEFDTQSKNIMQMOKANSKFEIGI
  830

841 TELKKLESKINKVFSTPIPFYSYKKNLDCWVDNEEDIDVILKKSTILMDINNDIISDISG
  908
  942

901 FNSSVITYPDQALVPGINGKAIHLVNNESSSEVIVHKAMDIEYNDMFNNFTVSVFLRVPKV
  973

961 SASHLEQYGTNEYSIISMMKKHSLSISGSGWSVSLKGNLIWTLKDSAGEVRQITFRDLPD
  973

1021 KFNAYL

...

1032 FIITNDRLLSSANLYINGVLMGSAEITGLGAIRDNDNITLKLDRCNNNOYVSDKDRIF
  1082

1092 CKALNPKEIEKLYTSYLSITFLRDFWGNPLRYDTEYVLIIPVASSSKDVQLKKNITDYMILT
  1104
  1107
  1127

1152 NAPSYYTNGKLNXYRRLYNGLKFIIKRYTPNNEIDSPVKSQDFIKLVSVYNNEHIVGYP
  1165
  1169

1212 KQGNFANLDRILRVGYNAPGIPLYKKWEAVKLRDLKTSYVQLKLYDDKNASLGLVGTNH
  1236

1272 GQIGNDPNRDILIASNWY

...

Times: -- Search Statistics --
CPU Total Elapsed

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00:00:00.01

00:00:01.00

Number of sequences searched:
Number of sequence hits:
Number of separate matches:
Number of sequence hits saved:

30
28
408
0

> O
O| |O IntelliGenetics
> O <

Quest - Quick User-directed Expression Search Tool
Release 5.4

-- Outline of search "seq23spt" --

Selected search type is key against sequence data banks or files.

Selected scope is Sequence.

Selected sequence key from "hayes346.key":

seq23 (AA) ID seq23 AA preliminary pattern

1 followed by

2 y

2 any character

2 any character

2 1 or i or m or a or f or w or v or y

Selected files:

File : bt_spt.pep

-- Output Parameters --

Format Options:

Nucleic acid code matching Exact File Options:

Find non-matching hits only No Indirect file

Report key used Yes Sequence or key file

Note position of hit Yes List of hits

Display full annotations Yes Hit display

Sequence context Yes Name and annotations

50

-- Run Parameters --

Run mode

Time to start comparison Batch

Notify at end of run now

1 match found in sequence:

o01388 ; Synaptobrevin homolog.

(from "bt_spt.pep")

TOIG of: o01388 check: 1900 from: 1 to: 169

ID O01388 PRELIMINARY; PRT; 169 AA.

AC O01388;

DT 01-JUL-1997 (TREMELrel. 04, Created)

DT 01-JUL-1997 (TREMELrel. 04, Last sequence update)

DT 01-JUN-2003 (TREMELrel. 24, Last annotation update)

DE Synaptobrevin homolog.

OS Hirudo medicinalis (Medicinal leech).

OC Eukaryota; Metazoa; Annelida; Clitellata; Hirudinida; Hirudinea;

OC Arynchobdellida; Hirudiniiformes; Hirudinidae; Hirudo.

OX NCBI_TaxID=6421;

RN [1]

RP SEQUENCE FROM N.A.

RC TISSUE=Nerve cord;

RX MEDLINE=97197869; PubMed=9045719;

RA Bruns D., Engers S., Yang C., Ossig R., Jeromin A., Jahn R.;

RT "Inhibition of transmitter release correlates with the proteolytic

activity of tetanus toxin and botulinus toxin A in individual cultured

synapses of Hirudo medicinalis."

RL J. Neurosci. 17:1898-1910(1997).

DR EMBL; U85805; AAC47498.1;

DR InterPro; IPR001388; Synaptobrevin.

DR Pfam; PF00957; synaptobrevin; 1.

DR PRINTS; PR00219; SYNAPTOBREVN.

DR ProDom; PD001229; Synaptobrevin; 1.

DR PROSITE; PS00892; V_SNAPE; 1.

SQ SEQUENCE 169 AA; 17817 MW; 363A0B3158F7B12B CRC64;

O01388 Length: 169 September 1, 2004 07:07 Type: P Check: 1900
Found using 'seq23' (hayes346.key)

...

64 GRADALQAGASQFEASAGKLRKRFWKNMKMMLMGAVVAVVVVIFGAWIYNKFSGTSSV
114

124 POGTFVLQSPMAQQPQSLPNIPIPPASPVGGGGGKKGNKQPH

...

2 matches found in sequence:

o01390 ; Syntaxin 1 homolog.

(from "bt_spt.pep")

TOIG of: O01390 check: 5090 from: 1 to: 295

ID O01390 PRELIMINARY; PRT; 295 AA.

AC O01390;

DT 01-JUL-1997 (TREMELrel. 04, Created)

DT 01-JUL-1997 (TREMELrel. 04, Last sequence update)

DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)

DE Syntaxin 1 homolog.

OS Hirudo medicinalis (Medicinal leech).

OC Eukaryota; Metazoa; Annelida; Clitellata; Hirudinida; Hirudinea;

OC Arynchobdellida; Hirudiniiformes; Hirudinidae; Hirudo.

OX NCBI_TaxID=6421;

RN [1]

RP SEQUENCE FROM N.A.

RC TISSUE=Nerve cord;

RX MEDLINE=97197869; PubMed=9045719;

RA Bruns D., Engers S., Yang C., Ossig R., Jeromin A., Jahn R.;

RT "Inhibition of transmitter release correlates with the proteolytic

activity of tetanus toxin and botulinus toxin A in individual cultured

synapses of Hirudo medicinalis."

RL J. Neurosci. 17:1898-1910(1997).

DR EMBL; U85807; AAC47500.1;

DR HSSP; P32851; 1BR0.

DR GO; GO:0016020; C:membrane; IEA.

DR GO; GO:008565; F:protein transporter activity; IEA.

DR GO; GO:006886; P:intracellular protein transport; IEA.

DR InterPro; IPR006012; Syntaxin.

DR InterPro; IPR006011; Syntaxin_N.

DR InterPro; IPR000727; T_SNAPE.

DR Pfam; PF05739; SNAPE; 1.

DR Pfam; PF00804; Syntaxin; 1.

DR SMART; SM00503; SynN; 1.

DR SMART; SM00397; t_SNAPE; 1.

DR PROSITE; PS00914; SYNTAXIN; 1.

DR PROSITE; PS0192; T_SNAPE; 1.

SQ SEQUENCE 295 AA; 33581 MW; 0DB3CC637A5886AF CRC64;

O01390 Length: 295 September 1, 2004 07:07 Type: P Check: 5090

Found using 'seq23' (hayes346.key)

...

90 KTANKVRGKLVLEQKIEQEEETKSSADLRIRKTOHSTILRKFIENVNQYNAAOVDYRD
140

150 GCKKRLQRQMEITGRATTNEELEDLMSGNPAIFTQGIITDQQ

...

213 QSIKELHDMFMDMAMLVESQGEIMIDRIEHNVEKAVDYVETAADTKKAMKYQSAARKKI
263

273 ILLICVSVLIIIVGSGLLGIFIP

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-----
15 matches found in sequence:
o06015 ; HA-70 protein (fragment).
(from "bt_spt.pep")
TOIG of: o06015 check: 1783 from: 1 to: 488

ID O06015 PRELIMINARY; PRT; 488 AA.
AC O06015;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA-70 protein (fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61225.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
DR NON_TER 488
FT SEQUENCE 488 AA; 55791 MW; 4789988BA9FA1640 CRC64;
SQ

O06015 Length: 488 September 1, 2004 07:07 Type: P Check: 1783
Found using 'seq23' (hayes346.key)

...

67 NTPPYCYTSSFNEKYIRDIVQNVFGNPNVQIPIGFECSTAPDNKNLYMYLQVTVIR
127 117 122
127 119 124
| | | | |
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| | | | |

127 YEIKVLQQQITERAVLYPSLGYVKSIEFNSNEKIDKNFYQVDDKILNEQFLYKKS
127 167 182
| | | | |
| | | | |
| | | | |

187 STNINKNKNDINTNSNTKTQPLVPYNSGLYVINKGDCGYIRTNDRD

...

263 FISSNLTKFSQQYTEERLKDAFNKLFNTSTALFKFVEEAPANKNICIKAYNTYKVELV
313 319
316
| | | | |
| | | | |
| | | | |

323 EYRNGTIINSAQYXLPISGYSEVIDVPSSGAPVVTPIVETQIQKGPTEEIVIGVISPD
342
| | | | |
| | | | |
| | | | |

383 ENIQQINTAISESYTIDPIDVGKKPFYILFTVNNTNFYKISAEDNSVPLKIVIGSGN
410 435
| | | | |
| | | | |
| | | | |
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443 RNMQGNLSNDNIKAINYITGFDFSDKDYLIIVQLFKGKNYYIRIPQ
471 483
-----
3 matches found in sequence:
o06016 ; HA-II protein.
(from "bt_spt.pep")
TOIG of: o06016 check: 8501 from: 1 to: 147

ID O06016 PRELIMINARY; PRT; 147 AA.
AC O06016;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-II protein.
GN HA-II.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61226.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; RicinB lectin.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.
DR SEQUENCE 147 AA; 17373 MW; 840EF98F4348FB67 CRC64;
SQ

O06016 Length: 147 September 1, 2004 07:07 Type: P Check: 8501
Found using 'seq23' (hayes346.key)

...

17 SIFSDSLYTLPLSELITFLTSTSENNOVKLQVVEEKNAKYNIAQPDKYLTYNSSQFI
67 70
| | | | |
| | | | |
| | | | |

77 VLKNGDSTALENYWIPYKTASNTYITNLKEYDKAWDIYDLNGDISDQPLLQQLFYFE
94 97
109
| | | | |
| | | | |
| | | | |

137 KSNQMFI FEKI

-----
3 matches found in sequence:
o06017 ; P-21 protein.
(from "bt_spt.pep")
TOIG of: o06017 check: 2847 from: 1 to: 181

ID O06017 PRELIMINARY; PRT; 181 AA.
AC O06017;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein.
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
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RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (Clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61227.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 181 AA; 21888 MW; AD156F632C55BAE4 CRC64;

O06017 Length: 181 September 1, 2004 07:07 Type: P Check: 2847 ..
Found using 'seq23' (hayes346.key)

1 MKMKDIFLHVKTLKNNTEFEIYRNFFNFDMLTRKYDVEKDYNIVSHLWILKKT
25 28
61 LNKFNTEYDLEKYISTLSKRYCIDICKKRNERNVYNSEFVDINLSLIEHSFSNDLEFE
137
121 FNDLISILPNSORKIIYMRFFNNFMKEVDIAEELNSROAVYKSKNALKKGESVIKELIN
137
181 I

-----
27 matches found in sequence:
o06018 ; NTNH protein.
(from "bt_spt.pep")
TOIG of: o06018 check: 3170 from: 1 to: 1198

ID O06018 PRELIMINARY; PRT; 1198 AA.
AC O06018;
DT 01-JUL-1997 (TREMBLrel. 04, Created)
DT 01-JUL-1997 (TREMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)
DE NTNH protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (Clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61228.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like lec_gl.
DR InterPro; IPR003016; Lipoyl BS.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTOLILYSIN.
DR ProDom; PD001963; Bontoxilysin; I.
DR PROSITE; PS00189; LIPOYL; I.
SQ SEQUENCE 1198 AA; 139082 MW; A7C4A31A5E5BEF60 CRC64;

O06018 Length: 1198 September 1, 2004 07:07 Type: P Check: 3170 ..
Found using 'seq23' (hayes346.key)

...

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60 NCGVYDSNLSQNEKDFLQAIITLLKRINSIAGEKLLSLVSTAIPPPYGI GGYYC
110
120 PNI VFGSTIKYKKINSLSITTFIPPGYGYRETNVLSKSDTENFYANNIVIFGPGANIV
147
180 ENNTVYKKEAENGMTMAEICFQFPLTYKYDQFYVDPALBELMECLIKSLYFLYGIKEN
211
211
240 NNLTVPYRLRNELSNIBFSQLSIVDLLISGGIDSKFINTPDPWFIDSYFSNAKTTFEEHK
281
300 SIYETEIKGNAIGNDIKRLKQKQFTTVDHIQLNLDYFSKEFQIMMPYRFNNALKYYY
363
360 RKEYYKIDYPEKYISAGFVGQQLNTQLSLSDKNQYIINKPELIVNLISENNISLMRSNIY
372
420 GDGLKYTTDNFYSTYKIPYNRAYEVHFNNSSTSLENVNVEEISNIPEIDINPYRENSD
431 438
480 IFSPVENIETKEVNTKTPWPINYLQAI PNNEEFTLSDFSQVYVYKTSIYVGSFLSNV
503 533
540 ISYLDVSKDTPIDTDEKYILWLREIFRNYSDITAIEINTSGINKVWSWFGKALNIL
558 559
600 NTSNSFVKEFKNL
...
615 ISLINKENLSPPIEVNEIPNDMLGLSLKDLNEKLFNLYLKNILYFKKVVESFLDQWWT
665
675 EYSGYFGLICWAKQSILAQENLIKVIQKKLSLDSKQSNISNEKINLMNLTTTEFTIDL
677 680
735 SNQSQIAMNNINFLNKAACVFFESNIYPKFISPFMEQYINNINIKTTAFIRKCTNITEKE
762
795 KLQLINQNTFNNLDFEPDIOTIENLLTSETNLIKEKTSYDILLFSLQADRRKVIKDI
836
855 SGKDTLVOYSDTIDLSYGVNGDALYLKPEPNSQVNF
...
912 GQDNLSNLIGNIVNCCWQIYFENNGLVFMSVDCNGNEKNYLSVDLSKYWYISVSD
962 965
972 PLRNKLIFINDKLIVNESIEQILNIYSSNIISLVNENNPICELSILNKALTSEEVIN
1032 SYFTNLNNSYIRDSYGARLEYKNKYELNYVFPENSLEYEVENNNMYLSIKNIKNTILG
1056 1078

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1092  AXFKLINTDESKQYQVQWDEVIIVGLDTEKYADIQAGNNRIQGVNSKONARKIIVNNNI
      |---|
      1123
1152  FRPNCVLFSYNNKYLISLRNNRYNWMICNDNSFIPKHAHLWLKKI
      |---|
      1165
-----
2 matches found in sequence:
006019 : Bont protein (Fragment).
(from "bt_spt.pep")
TOIG of: 006019 check: 7504 from: 1 to: 50

ID 006019 PRELIMINARY; PRT; 50 AA.
AC 006019;
DT 01-JUL-1997 (TrEMBLrel. 04, Created)
DT 01-JUL-1997 (TrEMBLrel. 04, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE BONT protein (Fragment).
GN BONT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 27322;
RA MEDLINE=97435242; PubMed=9290060;
RX Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; X87972; CAA61229.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
FT NON TER 50
SQ SEQUENCE 50 AA; 6036 MW; 04B0316B5A95C199 CRC64;

006019 Length: 50 September 1, 2004 07:07 Type: P Check: 7504
Found using 'seq23' (hayes346.key)

1 MPVNIKNFYNDPINDDIIMPEFNDPGQTYKAPRIIDRIWIPIERY
      |---|
      33 36
      34 37
-----
7 matches found in sequence:
033870 : Orf-22.
(from "bt_spt.pep")
TOIG of: 033870 check: 2449 from: 1 to: 178

ID 033870 PRELIMINARY; PRT; 178 AA.
AC 033870;
DT 01-JAN-1998 (TrEMBLrel. 05, Created)
DT 01-JAN-1998 (TrEMBLrel. 05, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Orf-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

1059
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
RT toxin.";
RL Submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
RL EMBL; U63808; AAB64350.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 178 AA; 21626 MW; 42382A79E7CE6B50 CRC64;

033870 Length: 178 September 1, 2004 07:07 Type: P Check: 2449
Found using 'seq23' (hayes346.key)

1 MNKLFLEIEMKSDNEEFQEIFKHFETINIFTRKYNIVDNYNDILYHLWYTLKKVDLSN
      |---|
      36 39 42 45 50
      39 42
61 FNTQNDLERYISRTLKRYCUDICNKRKIDKIIYNGEIAADKKLSLIANSYSSYSEFEFND
      |---|
      110 113
121 LISILPDDQKKIYKFEVDIEKIDIAKKLINISRSQVYKMKIMALERLEPILKKLINM
      |---|
      134
-----
25 matches found in sequence:
033871 : Nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: 033871 check: 4829 from: 1 to: 1197

ID 033871 PRELIMINARY; PRT; 1197 AA.
AC 033871;
DT 01-JAN-1998 (TrEMBLrel. 05, Created)
DT 01-JAN-1998 (TrEMBLrel. 05, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Nontoxic-nonhemagglutinin component.
GN NTNH/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
RT toxin.";
RL Submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
RL EMBL; U63808; AAB64350.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1197 AA; 138809 MW; 2AB7DE9B488F918E CRC64;

033871 Length: 1197 September 1, 2004 07:07 Type: P Check: 4829
Found using 'seq23' (hayes346.key)

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60 DGGIYDSNPLSQDSEKDFQAIITLLKRINSTNAGEKLLSLISTAIPFYGYIGGGYYA
110
120 PNMITFGSAPKSNKLLNSLSTSTIPFYAGYRETNLYLSSDNKSFYASNIVIFGPGANIV
147
180 ENNTVYFKKEDAEANGMTETEIFWQPFITYKDEFYIDPAIELIKLIKLSLYFLYGKPS
211
240 DDLVITPRLRSELENTYEQSLNIVDLVSGGIDPKPINTDPYWFNTDNYFSNAKVFEDHR
257
300 NIYETQIEGNN
...
313 GNDIKLRKQFRININDIWELNLYFSKEFSIMPPDRFNALKHFKYKQYKIDYPENY
363
373 SINGFWGOINVQLSLSDRNQDIINKPEEIIINLLGNVSLMRSNIYGDGLKSTVDFFYS
431
433 NYKIPYNRAYEYHFNNSSDSSLNVNIGVIDNIPEIIVNPKYKENCDFSPVQKITSTRE
434 438
493 INTNIPWPINYLQAQNTNNEKFSLSDSDFEVVSSKDSLVYFSPLSNMFPYLSIKYNSPI
503
553 DTDKKYLYLWLRIFRNYSFDITATQETINTDCGINKVVTWFGKALNINLSTDSFVERFQNL
558
...
615 ISLINKENLSPITIEIYIPNDMLGLPLNDLNEKLNILYLNKILYFKKYVFNFLDQWWT
665
675 EYISOYFDLICMAKQSIQAQEKLIQIIONKLODLFKADISMDKLNLMNLATEKTFIDLS
677 680
735 NESQIAINNINDFLNKSAICVFDNTNIPKFISEFMEQCINSVNSVTAFIQKCTNITEDEK
761
795 LQLIKINTFMNIDFEFDIQSIKDLITSETDLIKEKESDYNLFLTLQEDNNKVIEDIS
835
855 GKNTLVKYSDSISLVYGVNGDAIYLKEPDESVSF
...
914 IITSKLIENKADNCWEIYFENNGLVFSIVDCNGNEENIYLSDVISKWNYIISIDRLR
964
974 NOLLIFINDKLIANSIQEILNLYSSNTISLVNENNPIYIEGLSILNRSITSEEVNNYF
1032
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1034 SYLNNSYIRDISGERLEYNKTYELXNVVPFNSLYEVTENNNIYLSIKDTNNLNIEGAKF
1035 1055 1077
1094 KLINIDANKQYQKWDGEGVVCLLGDEEKYVDISSENNRIQLVNSKDTAKRIIFNNDIFMP
1122
1154 NCLTFAYNNKYLSSLRRDRNNMMICNNNDNIPKAAHLWALKGI
1164 1174
-----
1 match found in sequence:
O50596 : ORF-X2 (Fragment).
(from "bt_spt.pep")
TOIG of: O50596 check: 1868 from: 1 to: 51
ID O50596 PRELIMINARY; PRT; 51 AA.
AC O50596;
DT 01-JUN-1998 (TREMELrel. 06, Created)
DT 01-JUN-1998 (TREMELrel. 06, Last sequence update)
DT 01-NOV-1998 (TREMELrel. 08, Last annotation update)
DE ORF-X2 (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type A Kyoto-F;
RX MEDLINE=98126542; PubMed=9465394;
RA Kubota T., Yonekura N., Hariya Y., Isogai E., Amano K.,
RA Fujii N.;
RT "Gene arrangement in the upstream region of Clostridium botulinum type
RT E and Clostridium butyricum BL6340 progenitor toxin genes is different
RT from that of other types.";
RL FEMS Microbiol. Lett. 158:215-221 (1998).
DR EMBL; AB004778; BAAJ4886.1; -.
FT NON_TER 51 51
SQ SEQUENCE 51 AA; 5998 MW; 834EB4A69DD1157F CRC64;
O50596 Length: 51 September 1, 2004 07:07 Type: P Check: 1868
Found using 'seq23' (hayes346.key)
1 MNLAKPFIYDWKKTILKNAKESYSINEIIPKTFMELHGTKITNSTLNGT
9 12
-----
4 matches found in sequence:
O50597 : ORF-X1.
(from "bt_spt.pep")
TOIG of: O50597 check: 1145 from: 1 to: 142
ID O50597 PRELIMINARY; PRT; 142 AA.
AC O50597;
DT 01-JUN-1998 (TREMELrel. 06, Created)
DT 01-JUN-1998 (TREMELrel. 06, Last sequence update)
DT 01-NOV-1998 (TREMELrel. 08, Last annotation update)
DE ORF-X1.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type A Kyoto-F;
RX MEDLINE=98126542; PubMed=9465394;
RA Kubota T., Yonekura N., Hariya Y., Isogai E., Amano K.,
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PA Kubota T., Yonekura N., Hariya Y., Isogai E., Isogai H., Amano K.,
 EA Fujii N.,
 RT E and Clostridium butyricum BL6340 progenitor toxin genes is different
 RT from that of other types.";
 RL FEMS Microbiol. Lett. 158:215-221(1998).
 DR EMBL; D88419; BAA2483.1; -;
 SO SEQUENCE 416 AA; 47786 MW; 15798BBE2133755A CRC64;

O52977 Length: 416 September 1, 2004 07:07 Type: P Check: 8222
Found using 'seq23', (hayes346.key)

1 MNTYGWDIVYGCNRVWNKHLKXNYDENKIEFLYSDINKKEIWMFDNWEINGGSSNF
|--|
34 37

61 LRIKIFREGYFPRNTTVDLSGVIPILEIKLDFNDTSNPYIKELKFSFGKNTDNIKV
71 74

121 IVSDLGQLYEDEFYFNKLLISAFINNEKQSVIFASLNVTSNIVMNPQKFVYVSP
| -- |
154

181 TDNDGYLCILSVVTNRDISKLTSTVDSSILSENSEVGLLISEKLFPMENLLLPKLSSNMG
| -- |
187

241 SNITSNFNVINTSDTGIKNKNTLNWYGIKVAALYYPEINDFSMELFEGNKLKTRLS
| -- |
279

301 GIVKLTGRIYSKLNWECITKFIYDNKNKVSFEIYSTPIMECRDIFGLDGIIPAANAK
308 312

361 SVGNW

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7 matches found in sequence:
  069275 ; C2 toxin (Component I).
    (from "bt_spt.pep")
TOIG of: 069275 check: 8342 from: 1 to: 431

ID 069275 PRELIMINARY; PRT; 431 AA.
AC
DT 01-AUG-1998 (TREMblrel. 07, Created)
DT 01-AUG-1998 (TREMblrel. 07, Last sequence update)
DT 01-JUN-2003 (TREMblrel. 24, Last annotation update)
DE C2 toxin (Component I).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
[1]
RN SEQUENCE FROM N.A.
RP STRAIN=92-13;
RC Hofmann F., Barth H., Aktories K.;
RA "Clostridium botulinum DNA for C2 toxin (component-I), complete cds.";
RT Submitted (MAR-1998) to the EMBL/GenBank/DBJ databases

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RA Hofmann F., Barth H., Aktories K.;
RT "Clostridium botulinum DNA for C2 toxin (component-1), complete cds."; [NCBI](#)
RL Submitted (MAR-1998) to the EMBL/GenBank/DBJ databases.
DR EMBL: AJ224480; CAAL1969.1; -
DR GO: GO:0005576; C:extracellular; IEA.
DR GO: GO:00055070; F:toxin activity; IEA.
DR GO: GO:0009405; P:pathogenesis; IEA.
DR InterPro: IPR003540; Binary toxinA.
DR Pfam: PF03496; Binary toxinA.
DR PRINTS: PR01390; BINARYTOXINA.
SQ SEQUENCE 431 AA; 49313 MW; 9CB348771CE038A8 CRC64;

O69275 Length: 431 September 1, 2004 07:07 Type: P Check: 8342 ..
Found using 'seq23' (hayes346.key)

```

...
51 TKIDNFSTDILFSSLTATHEIMKEDENNHLFQVERIREALLKNTLDRDIAGYVNFYFKSLG
    |--|
    101

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111 INFSIRDVELNRDISDETLDKVRQIINQEYTKFISFISGLNDNSINESVPVIVKTRVPT
 |--|
 141

171	TFDYGVNDKETVSLNNQGSIIPIESAIITIKGDYILIEGSLSQELDFYNGSEAWG	174
	----	208

231 |--| |--| |--|
AENGYISKLSHEQIGALEGLHSDYKAINSYLRNNRVPNDELKKIELISSALSVKP
 234 257

291 | -- |
IPQTLIAYRRVDGIPFDLPDSFDFKKGEGEIIADKQKLNFEIDKWTGKEIENLSPSSTS
298

351 L

26 matches found in sequence:
o69276 ; Nontoxic-nonhaemagglutinin.
(from "bt spt.pep")

(from "bt_spt.pep")
 TOIG of: 069276 check: 5699 from: 1 to: 1161

ID	OC69276	PRELIMINARY;	PRT;	1161 AA.
AC	069276;			
DT	01-AUG-1998	(TrEMBLrel. 07, Created)		
DT	01-AUG-1998	(TrEMBLrel. 07, last sequence update)		
DT	01-OCT-2003	(TrEMBLrel. 25, last annotation update)		
DE	Nontoxic-nonhaemagglutinin.			
GN	NTNH.			
OS	Clostridium botulinum.			
OC	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;			
OC	Clostridium.			
OX	NCBI_TaxID=1491;			
RN	[1]			
RP	SEQUENCE FROM N.A.			
RC	STRAIN=NTCT 2916;			
RA	MEDLINE=98173581; PubMed=9504990;			
RA	Rodríguez Jovita M., Collins M.D., East A.K.;			
RT	"gene organisation and sequence determination of the two botulinum			
RT	neurotoxin gene clusters in Clostridium botulinum type A(B) strain			
RT	NTCT 2916."			
PL	Curr. Microbiol. 36:226-231(1998).			

[2]

KN	SEQUENCE FROM N.A.
RP	STRAIN=NCTC 2916;
RC	Rodriguez Jovita M.;
RA	Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
RL	EMBL: Y14238; CAA74630.1; --
DR	GO; GO:0008233; P:peptidase activity; IEA.
DR	GO; GO:0015070; P:coxin activity; IEA.
DR	GO; GO:0009405; P:pathogenesis; IEA.
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR	InterPro; IPR008985; ConA like lec.gl.
DR	InterPro; IPR000395; Peptidase M27.
DR	Pfam; PF01742; Peptidase M27; I.
DR	PRINTS; PR00760; BONTOXILYSIN.
DR	ProDom; PD001963; Bontoxilysin; 1.
DR	SEQUENCE 1161 AA; 135221 MW; 0F67D26135B8F74 CRC64

069276 Length: 1161 September 1, 2004 07:07 Type: P Check: 5699 ...

Found using 'seq23' (hayes346.key)

```
...
81  ATVKILQRIINNVIGAKLLSLISTAIPFPYBYRAEDYRQTYLSSKONQHYTANLVIFG
    |--|
    131
141  PGTNIVENVVYVKEDSKNGMGTMSEIWFPFLTYKYDQFYVDPFALELIKLSIYYL
    |--|
    178
201  YGKPNDDLSPYLRSEFNSLEYSELDMDVDFLISGGTDYKLLNTNPWFDTNDFINAPX
    |--|
    224
261  NFEKYKNDYETKIKNNNDIANISKLYLEQKEKTNVQDIWELNLSYFSTEFEMMPEIFNN
    |--|
    330
321  ALNHYHRKEYVIVDYPFNYNINGFINGQIKTILPLSKYKNKIINKPELIVNLINENNSVL
    |--|
    398
381  MKNYIGDGLKDTIGNFYAYKIPYNGIDYHINSSDCLDNVDIKEIDNIPPINDADIY
    |--|
    471
441  PYRKNCDEPTPVYNITETKEINTTIPFPVYLOQVYNSNDINLSDFLKVISSKORSIV
    |--|
    501
501  YSFLDNTIDYLSIKYDGPIDTDKTYLWLKEIFRNVSPDITATQEIINTDGINKVVTWF
    |--|
    526
527
561  GKALNLTSDSFVEEFQNL
    |--|
    633
634
583  ISLINKENLMPKIEIDEIPNSMLNLSFKDLSENLNFISKNNSYFEKIYYDFLDQWWT
    |--|
    633
634
643  QYYSQYFDLICKAKRSVLAQESLIKKIKQKLSYLGNSNISNDLMLNLTNTLRDI
    |--|
    645
648
703  SNESQIANNVNNFLNVAICVFQTNIPKFLSFMEQCINNKNKNTREFIQKCTNITENE
    |--|
    730
763  KQLINQNIFFSSLDPDFLNIENLKSFNSETGLIKEETSPYELVLYAFQEPGNAIGDA
    |--|
    804
823  SGKNTSIEYSKDIGLVYGINSDALYNGSNQSI SFSDFFENGLTNSFSIYFWLNLGKD
    |--|
    873
883  TIKSKLGSKEDNCWEIYFQDTGLVFNMDISNGNEKNIYLSDVSNNSWHYITISVDRLK
    |--|
    933
943  EQLLIFIDDLNVANESIKEILNIYSSNTISLVNENNPYVBSGLINLKPPTSQEVLSNYF
    |--|
    1001
```

```
1003  KVLNNSYIRDSSEERLEYNTQYLYNVFVSENPIYEIKQNNNIYLTNTNNLNQVSKF
    |--|
    1004
    1024
    1027
1063  KLLSINPNKQYVQKLDEVIISVLDNMEKYIDISEDNRLQLIDNKNNAKMTIISDNDFISN
    |--|
    1091
1123  CLTIISYNGKVICSMKDNENHNMICNDNDMSKYIYLWSEK
    |--|
    1132
    1154
-----
28 matches found in sequence:
069277 ; Nontoxic-nonhaemagglutinin.
(from "bt_spt.pep")
TOIG of: 069277 check: 574 from: 1 to: 1198

ID 069277 PRELIMINARY; PRT; 1198 AA.
AC 069277;
DT 01-AUG-1998 (Tremblrel. 07, Created)
DT 01-AUG-1998 (Tremblrel. 07, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE Nontoxic-nonhaemagglutinin.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=NTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organisation and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain
RT NCTC 2916."
RL Curr. Microbiol. 36:226-231 (1998).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=NTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; Y14239; CAA74634.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cons like lec gl.
DR Pfam; PF01742; Peptidase M27.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1198 AA; 138424 MW; 8DA6F6C815009D0B CRC64;

069277 Length: 1198 September 1, 2004 07:07 Type: P Check: 574
Found using 'seq23' (hayes346.key)

...
60  DGGYDSNFLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLISTAIPFPYGYGGYYA
    |--|
    110
120  PNMTFSGAPSKNKKLSLISSTIPFYAGYRETNYLSSDNKSFYASNIVIFGPGANIV
    |--|
    147
180  ENNTVFYKEDAENGMTMTIWFQPLTYKYDFYDPALELIKLSIYFLYGIKPS
    |--|
    211
    231
```

9 matches found in sequence:
085760 : ABC translocator (Fragment).
(from "bc_spt Pep")
TOIG of: 085760 check: 2577 from: 1 to: 545

ID 085760 PRELIMINARY; PRT; 545 AA.
AC 085760;
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ABC translocator (Fragment).
GN BRCT.
OS Brochothrix campestris.
OC Bacteria; Firmicutes; Bacillales; Listeriaceae; Brochothrix.
OX NCBI_TaxID=2757;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC43754;
RX MEDLINE=99054910; PubMed=9835559;
RA McCormick J.K., Poon A., Sailer M., Gao Y., Roy K.L., McMullen L.M.,
RA Vederas J.C., Stiles M.E., Van Belkum M.J.;
RT "Genetic characterization and heterologous expression of brochothrix
an antitubulin, two-peptide bacteriocin produced by Brochothrix
campestris ATCC 43754."
RL Appl. Environ. Microbiol. 64:4757-4766 (1998).
DR EMBL; AF075600; AAC95142.1; -.
DR MEROPS; C39.001; -.
DR GO; GO:0016021; C: integral to membrane; IEA.
DR GO; GO:0005524; F: ATP binding; IEA.
DR GO; GO:0004009; F: ATP-binding cassette (ABC) transporter acti. .; IEA.
DR GO; GO:0008233; F: peptidase activity; IEA.
DR GO; GO:0019534; F: toxin transporter activity; IEA.
DR GO; GO:0006508; P: proteolysis and peptidolysis; IEA.
DR GO; GO:0006810; P: transport; IEA.
DR InterPro; IPR005897; ABC_bact_transpt.
DR InterPro; IPR001140; ABC_TM_transpt.
DR InterPro; IPR005074; Peptidase_C39.
DR Pfam; PF00664; ABC membrane; 1.
DR Pfam; PF03412; Peptidase_C39; 1.
DR TIGRFAMs; TIGR01193; bact_toxins; 1.
FT NON TER 545 545
SQ SEQUENCE 545 AA; 878E08D295998B00 CRC64;

085760 Length: 545 September 1, 2004 07:07 Type: P Check: 2577
Found using 'seq23' (hayes346.key)

...
45 QGTSALGLVCALETGLGFESEVYQTDSTIWKEESLIPFIAHVVDKSFHYVVIYKNG
95 98
105 KILLADPAKGLTKTDFEGKWTGIVLSTSTPNYKAIRDSSHGLFHYLPLLKQKKMI
140
165 MAIIFLSVLTCGIVGSYFQIIDDKIIPSNINLLSIISILLTIYITQAILQYIKY
184
225 FLIKLQRLSSIIMLGYFRHVLRLPMNFFSTRKSGEIIISRFIDATKVIDALANSTLSFL
227
285 DVSMILLIIGASLFIQNNLLFLISFTTVPYITLVVYVFIKPFNCSNEEQLEAGAVLNHII
314 319
345 ESLKGIETIKSFNATDQIYSNINKDQFQDMVMVSKLKKENLDNLQANLKWALQATSTTILW
363

240 DDLVIPYLRSELENTEYSQNLVDLLVSGGIDPKFINTDPPYWFIDNYPFNAKVPFEDHR
257
300 NIYETEIEGNAIGNDIKRLKQKFRININDIWELNINYPFSEKFSIMMPDRFNALKHGF
363
360 RKQYKIDYPENYSINGFVNGQINAOQLSDRNODIINKPEEIIINLLGNVNSLMRSNIY
363
420 GDGLKSTVDDFYSNYKIPNRAVEYHFNNSDSSLDNVNIGVIDNIDELIDVNPYKENC
431
480 KFGSPVQKITSTREINTNIPWPINYLQRAQNTNNEKFSLSDFVEVSSKDKSLVYFSLNV
503
540 MFYLDISKONSPIDTDKKYLLWLRBEIFRNYSFDITATQETINDCGINKVVTWFGKALNIL
558
559
600 NTSDSFVEEFQNL
677
615 ISLINKENLSMPKIEIDEIPNSMLNLSFKDLSENLFNIPSKNNSYFKEIYDFLDQWWT
665
666
675 QYYSQYFDLICWAKRSVLAQESLIKKIIOKKLSYLGNSNISDNLMLNLTNTTLRLDI
677
735 SNESQIAMNNVNNFLNNVAICVFQTNIVPKTISFMEQCINNINKNTREFIOKTNITENE
762
795 KLQLINQIFSLDFDLMIENLKSLSFNSETGLLIKEETSPYELVLYAFQEPGNNAIQDA
836
855 SGKNTSIEYSKDGLVYGINSDALYNGSNQISFSNDFENGLTNSFSIYFWLRNLGKD
905
915 TIKSKLIGSKEDNCGWEIFYQDTGLVFNMDISNGNEKNIYLSDSVNSNWHYITISVDRLK
965
975 EQLLIFIDNLVANESIKEILNIYSNTISLVNENNPPIVEGLSILNRSITSEEVVNNYF
1033
1035 TYLNNSYIRDISGERLEYNKTYELNYVPFESSLYEVTENNIIYLSIKNTNNLNIOGAKF
1036
1056
1059
1095 KLINIDANKQYVQKWDGEGVCLLGDEKYYVDISSENNRIQLVSSKDTAKRIIFNNDIFRP
1123
1155 NCLTFAYNNKYLISLSDRLNRYNNMNCNNNDNIPKAAHLWALKGI
1165
1175


```

405      IGTSLVLKQSLGTLITLAINMAYFTPLQNLINLQVKIQAAKVANDRLNFIFYLEQDGH
      423
465      LCEDSILSLSTS
...
-----
12 matches found in sequence:
086171 ; C2 toxin (Component-II) .
{from "bt_spt.pep"}
TOIG of: 086171 check: 3459 from: 1 to: 721

ID      086171      PRELIMINARY;      PRT;      721 AA.
AC      086171;
DT      01-NOV-1998 (TRENBLrel. 08, Created)
DT      01-NOV-1998 (TRENBLrel. 08, Last sequence update)
DT      01-JUN-2003 (TRENBLrel. 24, Last annotation update)
DE      C2 toxin (Component-II).
OS      Clostridium botulinum.
OC      Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae
OC      Clostridium.
OX      NCBI_TaxID=1491;
RN      [1]
RP      SEQUENCE FROM N.A.
RC      STRAIN=type C;
RC      MEDLINE=98323874; PubMed=9659689;
RA      Kimura K., Kubota T., Ohishi I., Isogai H., Isogai E., Fujii N.
RT      "The gene for component-II of botulinum C2 toxin.";
RL      Vet. Microbiol. 62:27-34(1998).
RN      [2]
RP      SEQUENCE FROM N.A.
RC      STRAIN=type C;
RC      MEDLINE=96184657; PubMed=8645309;
RA      Fujii N., Kubota T., Shirakawa S., Kimura K., Ohishi I., Moriis
RA      Isogai E., Isogai H.;
RT      "Characterization of component-I gene of botulinum C2 toxin and
RT      detection of its gene in clostridial species.";
RL      Biochem. Biophys. Res. Commun. 220:353-359(1996).
DR      EMBL; D88982; BAA32537.1; -.
DR      HSSP; P13423; IACC.
DR      GO; GO:0005576; C:extracellular; IEA.
DR      GO; GO:0015070; F:toxin activity; IEA.
DR      GO; GO:0009405; P:pathogenesis; IEA.
DR      InterPro; IPR003896; Anthrax toxinB.
DR      Pfam; PF03495; Binary toxB; I.
DR      PRINTS; PR01391; BINARYTOXINB.
SQ      SEQUENCE 721 AA; 80515 MW; 44C8153AC749D5F2 CRC64;

O86171 Length: 721 September 1, 2004 07:07 Type: P Check: 3459
Found using 'seq23' (hayes346.key)

1      MLVSKFENVSKNKNFYFTTGLMGLGYGFENDFFNLNIISPTLDGNLTFSKEDINSILGNK
      17 20
851      IIKSARWIGL
      ---|
      STNSPNCRVELNGEIFNLSLNTSNTVNLIQGVYDIRIEQLMSENQLLNKYEGLKLYWET
      132
142      SDIIKEIIPSEVLKPNYSNTNEKSKFIPNNTLIFSNAKLKANANRDTDRGIPDEWEING
      ---|
202      YTYVMNQKAVADDKFAANGYKVKVSNPFKECTANDPYTDPEKVSQIDPSVSNVARDPMI
      221
      228

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Thu Sep 2 08:56:12 2004

seq23.spt.res

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261 NFEKYKYYETVKYNNNDISNSIKLYEQKFTNVODIWEINLSYFSKEPQIMPERYNN 318
    265
321 ALHYYKYYMIDYFKYNNISGFVNGQINTRPLSKYKNDIISKPELIVNLINENNTIL
    330
381 MKNYIGDGLKDRTRTFNSYKIPYSTNYEQINHNSYNNNVEEISNIPIDDKDIYPY
    398
441 RKNADSFIPYISASTKEITTTPLPYNLQAMTNNNKLKSLDELEVISSKGLSVYSFLN 436
    451
501 NTIDYLSIKYDKPINTAERYEYEWLKSIFRNSYSPDITETQETINTSCGTTKVVPWIGKALN
    521
561 ILTNTNSFVEFEKL
...
578 ISLINKENITMPKIEIDEIPNSMLNSFNDLSNNLNFYAKNNSYFKKIYFNLDQWMT
    628
638 QYQSYFYLICMGKKSVLAEKLIKELIKQLNLYLRNSISSDLALMNLTTTTLRDI
    640
698 SNKSIAMNNIDDFPNAACVQFSNIYFKFISFMQOCINGINENTKYFIQKCTNTEDE
    725
758 KLQIMQNSLNSLNFDFLDIEKIKLFSYTRLLIKKQSSPYELSYAFQGEDKNVIGDG
    787
818 SGKNTLVEYTNIDIGLYGINNALVYLNQSNQSVFTNDYFENGLTNSFSIYFWLRNLGKD
    868
878 LIKSKLISSKLDNCGWEIYLEDNGLVFNIDNSNGSYKKIYISDMNNSWNYIALSVDRKE
    913
938 QLLIFVNDVLVANEDIKILNIYSSNTISLVSENNOICIEGLSILNTNITKBEVLNLYFA
    913
998 DLNNSYIRNGNEERLEYNNKYNLFYVFSKTPICKVNNHNNKIYLSINDDNLSNVKPLSPM
    1018
1058 LLSVDSNKYVQKDEVIISILDDKERYLCKSNEDNRIEIVDNKSSANIFIINDDIFISN
    1040
1118 CLTLKFNKPYLSEKYMNYNWIENKTYTPKKAYLWILKNI
    1134
-----
3 matches found in sequence:
087710 ; BoNT protein (Fragment) .
(from "bt_spt.pep")
TOIG of: 087710 check: 4235 from: 1 to: 49

```

```

226 NLVLPKLSNMGGISGRNFQVISTSDTTAILKNNILNWWYGIKILGLIWWYPRIKWFYLK 276
    276
286 PFEQKNIELMGVEKLSGEIYVADFSINSINKFIYDSRNKKAYPEIDNNAKTDKILHI
    305
346 RPIDLIPLAINSVAVWMSIKNALGFLANFTDIINDIVNWNFKISEVTNVIWNVG
    361
406 FCIQGRAN
-----
29 matches found in sequence:
087710 ; NTNH protein.
(from "bt_spt.pep")
TOIG of: 087710 check: 8868 from: 1 to: 1160
ID 087710 PRELIMINARY; PRT; 1160 AA.
AC 087710;
DT 01-NOV-1998 (TrEMBLrel. 08, Created)
DT 01-NOV-1998 (TrEMBLrel. 08, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE NTNH protein.
GN NTNH.
OS Clostridium baratii.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1561;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43256;
RA MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hielm S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic & non-proteolytic Clostridium botulinum and Clostridium
RT baratii.";
RL Curr. Microbiol. 37:262-268(1998).
DR EMBL; Y12091; CAA72807.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTXIIYISIN.
DR ProDom; PD001963; Bontotoxilin; 1.
SQ SEQUENCE 1160 AA; 135776 MW; 75ACF3F2B4B7C534 CRC64;
087710 Length: 1160 September 1, 2004 07:07 Type: P Check: 8868
Found using 'seq23' (hayes346.key)
...
81 ATIKILQRINNIVGEKLLSLIATAMPFPYEGAEDEFRTQNYLSKDNKYYPANLIVFG
    131
141 PGSNLIENSVCYKKEYSENGMTMCEVWFQPLTYKIDGFYNDPALELIKCLKLSLYL
    178
201 YGKIPSDLSIPYLRSEFNLEYSELDIIDFLISGNDYKFLNTNPFYWLTSDFYNASK
    221
    224
-----

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```
ID AC 087711 PRELIMINARY; PRT; 49 AA.
DT 01-NOV-1998 (TREMBlrel. 08, Created)
DT 01-NOV-1998 (TREMBlrel. 08, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE BONT protein (Fragment).
GN BONT.
OS Clostridium baratii.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1561;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=ATCC 43256;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hiem S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic & non-proteolytic Clostridium botulinum and Clostridium
RL baratii";
RL Curr. Microbiol. 37:262-268(1998).
DR EMBL; Y12091; CAA72808.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:coxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001983; Bontoxilysin; 1.
FT NON_TER 49
SQ SEQUENCE 49 AA; 6056 MW; 1C221EB3E325878 CRC64;

087711 Length: 49 September 1, 2004 07:07 Type: P Check: 4235
Found using 'seq23' (hayes346.key)

1 MFVNNFNNDPNNNTTILYMKMPYEDSNKYKAFETMDNIWIIPER
21 24
33 36
34 37

-----
27 matches found in sequence:
p71107 ; Ntnh protein.
(from "bt_spt.pep")
TOIG of: p71107 check: 3832 from: 1 to: 1193

ID P71107 PRELIMINARY; PRT; 1193 AA.
AC P71107;
DT 01-FEB-1997 (TREMBlrel. 02, Created)
DT 01-FEB-1997 (TREMBlrel. 02, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum A.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36826;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X92973; CAA63550.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
```

```
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase.M27.
DR Pfam; PF01742; Peptidase.M27.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1193 AA; 138020 MW; DB4590A1EFD609A4 CRC64;

P71107 Length: 1193 September 1, 2004 07:07 Type: P Check: 3832
Found using 'seq23' (hayes346.key)

...
60 DGIYDSNFLSQDSEKDFLQAIITLLKRINSTNAGEKLLSLISTAIPFPYGYGGYYA
110
120 PNMITFGSAPKSNKKLNLSLSTTIPFPYAGYRETNLYLSSDNKSFYASNIVIFGGANIV
147
180 ENNTVFYKKEAENGMTWTEINFPQPLTYKDEFYIDPAIELIKLIKSLYFLYGIKPS
211
240 DDLVIPYLRSELENIYSQINIVDLLVSGGIDPKFINTDPYWFNTDNYFSNAKKVPEDHR
257
300 NIYETIEGNN
...
313 GNDIKLRLLKQKFRININDIWLGLNLNLYFSKFSIMPDFFNNALKHFYRKYYKIDYPENY
363
373 SINGFVNGQINAQLSLSDRNQDIINKPEEIIINLGNVSLMESNIYGDGLKSTVDFFYS
431
433 NYKIPYNRAYEYHFNNSSDLNVDNNGVIDNIPEIIDVNPYKENCDFSPVQKITSTRE
434 438
493 INTNIPWPINYLQAOQNTNNEKFSLSDFVEVVSVDKSLVYFSLSNVMFYLSIKDNSPI
503
553 DTDKKYLLWLREIPRNYSPDITATQEQINTNCINKVVTWFGKALNLTNLSDFSVEEQML
558
559
...
615 ISLINKENLSMPTIESYEIENDMLGLFLNDLNEKLFNYSKNTAYFKIYYNFDQWWT
665
666
675 QYYSQYFLICMAKRSVLAQETLRIQKKLSYLGNSNISDNLALMLNTTTNLTLDRI
677
680
735 SNESQIAMNVDSFLNNAICVFESNIYPSFMBQCIINNINIKTEFIQKCTNINEDE
762
```

P71108 Length: 1193 September 1, 2004 07:07 Type: P Check: 4532
Found using 'seq23' (hayes346.key)

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...
60  DGGIYDSNFLSQDSERENFLQAIILLKRINNTISGKQLSLISTALPPFYGYGGYSS
    110
120  PNITFGKTPRTNKLNSLVTSTIPFPFGYRETNVIESQNNKNFYASNIIIFPGSGSNIV
    231
180  ENNVIVYKNDAGNGMGTAIEIVFQPLLTYKKNFYIDPAMELTCKLISLYFLYKIKPS
    231
240  GNLVVPYRLATELDNKFQSQNLIDLLISGVDLEFINTNPYMTNFTNSYFFNSIKMPEKYK
    298
300  NIYKTEIEGNAIGNDIKRLKQKQFQINVQDIWNLNLNYFCQSFNSIPDRFSNALKHFY
    301
360  RKQYTTMDYTDNYNININGFVANGQINTKPLSNKNTNIIISKPEKVVNLVNNNISLMKSNII
    363
420  GDGLKGTTEDFYSTYKIPYDEEYERFNDSDNFFLNINISIEEVDSDIPEIIDINPYKNSD
    431
480  NLVFTQITSMTEEVTTHTALSYNLQAOITNNENFTLSSDFSQVSSKXKSLVYSFLDNL
    503
540  MSYLETIKNDRPIHTDKKYLLWKEVFNKYSFDINLTQEI DSMCGINQVVLWFGKALNII
    558
    559
600  NTSNSFVBEYQDGAICLISKKDNLREPNIIEIDISDLSLLGSLFKDLNNKLYEYISKNI
    651
660  YPKKIYFSLDQWWTQYISQYFDLIMAKKSLAQETLIIKKIQQKLSYLGNSISSDN
    665
    677
    680
720  LALMNLTTTLTLDISNESQIAMNVDSFLNSAAICVPEGNIYPKFISPFMEQINNKN
    762
780  TREFIQCTNITENEKLIQINQINQINQINQINQINQINQINQINQINQINQINQINQIN
    836
840  LYAFQEPDNNAGDASAKNTSIEYSKDIDLIVYGINSDALVINGNSQISFSDNFPENGLT
900  NSPSIYFWLRLNLGKDTIKSLIGSKGDCNGWEIYFQDTGLVFNMDISNGEKNIYLSVDS
    905
960  NNSWHYITISVDRLEQQLIPIDDDNLVANESIKELIYSSNIISLSENNPSYIEGLTI
    965
1020  LNKPTTSQEVNLNNYFKVLNNSYLSDSNEERLEYNKTYQLNYVFSKPICEVQNNNIYL
    1020

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795  KLQLINQNVFNSLDPEFLNIQNMKSLFSSETALLIKEETWPELVLYAFKBPQNNVIGDA
    836
855  SGKNTSIEYKDIQGLVYGINSDALVINGNSQISFSDNFPENGLTNSFSIYFWLRLGKD
    905
915  TIKSKLIGSKEDNCGWEIYFQDTGLVFNMDISNGEKNIYLSVDSNNSWHYITISVDRLE
    965
975  EQLLIFIDDLNLANESIKELIYSSNIISLSENNPSYIEGLTILNKPTTSQEVLSNYF
    1033
1035  EVLNNSYIRDSNEERLEYNKTYQLNYVFSKPICEVQNNNIYLTINNTNINLNLQASKF
    1036
    1056
    1059
1095  KLLSINPNKQYVQKLDVILSVLDNMEKYIDISDNRLQLIDNKNNAKMIISNDIFIS
    1123
1155  CLTSLYNGKYICLSMKDQENHNWMI CNNDMSKYLWLSFK
    1164
    1186
-----
25 matches found in sequence:
p71108 ; Nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIC of: p71108 check: 4532 from: 1 to: 1193

ID  P71108  PRELIMINARY;  PRT;  1193  AA.
AC  P71108;
RC  01-FEB-1997 (TremBLrel. 02, Created)
DT  01-FEB-1997 (TremBLrel. 02, Last sequence update)
DE  01-OCT-2003 (TremBLrel. 25, Last annotation update)
DE  Nontoxic-nonhemagglutinin component.
OS  Clostridium botulinum.
OC  Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC  Clostridium.
OX  NCBI_TaxID=1491;
RN  [1]
RN  [2]
RP  PARTIAL SEQUENCE FROM N.A.
RA  Kubota T., Fujii N.;
RA  Kubota T., Shirakawa S., Kozaki S., Isogai E., Isogai H., Kimura K.,
RL  Submitted (APR-1996) to the EMBL/GenBank/DBJ databases.
RN  [2]
RC  SEQUENCE OF 653-793 FROM N.A.
RX  MEDLINE=96311376; PubMed=8713133;
RA  Kubota T., Shirakawa S., Kozaki S., Isogai E., Isogai H., Kimura K.,
RT  "Mosaic type of the nontoxic-nonhemagglutinin component gene in
RT  Clostridium botulinum type A strain isolated from infant botulism in
RT  Japan.";
RL  Biochem. Biophys. Res. Commun. 224:843-848(1996).
DR  EMBL; D84289; BAA12299.1; -.
DR  PIR; JC4901.
DR  GO; GO:0008233; F:peptidase activity; IEA.
DR  GO; GO:0015070; F:toxin activity; IEA.
DR  GO; GO:0009405; P:pathogenesis; IEA.
DR  GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR  InterPro; IPR008985; Consil-like lec_gl.
DR  InterPro; IPR000395; Peptidase_M27.
DR  Pfam; PF01742; Peptidase_M27; 1.
DR  PRINTS; PR00760; BONTOTOXILYSIN.
DR  ProDom; PD001963; Bontotoxylisin; 1.
SQ  SEQUENCE 1193 AA; 137838 MW; F6B07B86500C79E1 CRC64;

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-----
1080 1080 1033 1056 1059 1078
      -|-----|-----|-----|
      TTNNTNLLNQPSKFKLLSNPNKQYVQKLDEVIISVLGNMEKYIDISEDNRLQLIDNKN
      1081 1123
1140 1140 1164 1186
      -|-----|-----|-----|
      GAKKMIISNDMFISNCLITLSCGKGYICLSMKDENHNMMICNDMSKYLWSPK
      1164 1186

26 matches found in sequence:
p71109 ; Nontoxic-NONHEMAGGLUTININ (Partial P-21 gene and P-47 gene) (Strain
(from "bt_spt.pep")
TOIG of: p71109 check: 9160 from: 1 to: 1159

ID P71109 PRELIMINARY; PRT; 1159 AA.
AC P71109;
DT 01-FEB-1997 (Tremblrel. 02, Created)
DT 01-FEB-1997 (Tremblrel. 02, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE Nontoxic-NONHEMAGGLUTININ (Partial P-21 gene and P-47 gene) (Strain
DE KYOTO-F).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=KYOTO-F;
RA East A.K., Stacey J.M., Collins M.D.;
RL Submitted (OCT-1996) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=KYOTO-F;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RL Submitted (OCT-1996) to the EMBL/GenBank/DBJ databases.
DR EMBL; X87974; CAA61233.1; -.
DR EMBL; X96493; CAA65348.1; -.
DR GO; 0008233; F:peptidase activity; IEA.
DR GO; 0015070; F:toxin activity; IEA.
DR GO; 0009405; P:pathogenesis; IEA.
DR GO; 0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cona-like_rec_91.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS001963; Bontoxilysin; 1.
SQ SEQUENCE 1159 AA; 134868 MW; D8F46CF24DE92C56 CRC64;

P71109 Length: 1159 September 1, 2004 07:07 Type: P Check: 9160 ..
Found using 'seq23' (hayes346.key)
...

81 81 131
      -|-----|-----|-----|
      ATVKILQRINNNVIGAKLLSLISTAIPFPYKPGDYROTNYLVSKDNQHYXTANLVIFG
      131
141 141 178
      -|-----|-----|-----|
      PGTNIVENNAIYKKEDSNGMGTSMTSEIWFQFLTYKGFYVDPALELIKLIKLSLYL
      178
201 201 240
      -|-----|-----|-----|
      YGKPSDDLISFYRLRSELNFEYSELDIMDELISGGTEYKLLDTNPYWFDTNYFIDAPK
      201 240
261 261
      -|-----|-----|-----|
      NFEKYNDYETKIKNNDIANSIKLYLEQFKTNAQDIWELNLSYFSTFEIIMPEIFNN
      261
321 321
      -|-----|-----|-----|
      ALNHYYRKEYVYIDYFKNYNGFINGQIKTILPLSKYKNKIINKPELVNLLINENNTVL
      321
```

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DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Chiba-H;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96491; CAA65345.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 1 1
FT NON_TER 116 116
SQ SEQUENCE 116 AA; 13890 MW; B9AB5089BB3C711F CRC64;

P71110 Length: 116 September 1, 2004 07:07 Type: P Check: 214 ..
Found using 'seq23' (hayes346.key)

...

41 MKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDLISILPNTQONIIYMKFFKDMKD
|---|
91 94

101 IDIAKKLKISRQSIYK

-----
1 match found in sequence:
P71111 ; P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71111 check: 146 from: 1 to: 116

ID P71111 PRELIMINARY; PRT; 116 AA.
AC P71111;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 9837;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96492; CAA65346.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 1 1
FT NON_TER 116 116
SQ SEQUENCE 116 AA; 14006 MW; 30356862D69E3962 CRC64;

P71111 Length: 116 September 1, 2004 07:07 Type: P Check: 146 ..
Found using 'seq23' (hayes346.key)

...

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41 MKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDLISILPNTQONIIYMKFFKDMKD
|---|
91 94

101 IEIAKKLKISRQSIYK

-----
4 matches found in sequence:
P71112 ; P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71112 check: 7664 from: 1 to: 159

ID P71112 PRELIMINARY; PRT; 159 AA.
AC P71112;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kyoto-F;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96493; CAA65347.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
FT NON_TER 159 159
SQ SEQUENCE 159 AA; 19336 MW; EBF367CE90543904 CRC64;

P71112 Length: 159 September 1, 2004 07:07 Type: P Check: 7664 ..
Found using 'seq23' (hayes346.key)

...

1 MKNLFLLMNTLKDDNKKFEDYMKYKDLIDIFIKKYNLSYNDILKHFILIKADLNK
|---|
22 25
42 45

61 ENTENDLNKYSKLCRYCLSIKMKNRDKKIYNSBITDINLNLIQDSCFNDFEFKDFD
|---|
134

121 LISILPNTQONIIYMKFFKDMKMDIAKKLKISRQSVYK
|---|
134

-----
8 matches found in sequence:
P71113 ; P-47 protein.
(from "bt_spt.pep")
TOIG of: P71113 check: 9356 from: 1 to: 416

ID P71113 PRELIMINARY; PRT; 416 AA.
AC P71113;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-DEC-2001 (TrEMBLrel. 19, Last annotation update)
DE P-47 protein.
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kyoto-F;

```

RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96493; CAA65349.1; -.
SQ SEQUENCE 416 AA; 47476 MW; 749EB3877C4A9D2E CRC64;

P71113 Length: 416 September 1, 2004 07:07 Type: P Check: 9356
Found using 'seq23' (hayes346.key)

1 MNTYGWDIVVGCSSRVVKNHKEYITKNNIQFYLSNIDKKQEIKNMVFNDWEIINGSSNF
34 37
61 LAIKTPIKGEYFKVRNTTVLDSGINPVLRIKLDFFNDISNPNIKELKFNGFSNDDIKI
71 74
121 IVSDINGNLQEDDEFYFNKLLINAFITONEKQISYIFASLNVTSDIEMWNPQKPFVYISP
154
181 TDNSDGYLFILSVVTVNRDISKLSANVDGNILGNNSVGLLISEKFLQNVLSRLSSNMG
187
241 SNINKNFEVISTDPTGRVNNSTLNWYGLKVAALYYYPKINFSMWQLFEGNKLKLSLR
279
301 GLVRLTGLEAVSDSEIQQISQNFVYVNSTKNKAYFEVDKNPTSSYKHYLFPGLDLSLAVLS
312 333
361 SVTHWSIKSIEGALGFELINNFVDLINNTIKNNLKISQ
333
...
4 matches found in sequence:
P71114 : P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: P71114 check: 8589 from: 1 to: 159

ID P71114 PRELIMINARY; PRT; 159 AA.
AC P71114;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Langeland NCTC 10281;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: Evidence of chimeric sequences in the gene
RT encoding the nontoxic-nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96494; CAA65350.1; -.
SQ SEQUENCE 159 AA; 19355 MW; 12CA84E69477DA96 CRC64;

P71114 Length: 159 September 1, 2004 07:07 Type: P Check: 8589
Found using 'seq23' (hayes346.key)

1 MEDLFFPIIKLDDNKKFEDIYVNYKNLIDIFIKYKNLSYNDILNHFHILKADLNK
22 25 25 28
42 45
61 ENTENDLNKYISKLCRYCLSIQMKKNRDKKIYNSEITNINLNLIQDNCFNDEIEPFKD
134
121 LISILENTQNIYYMKPFKDKMDKDIQIAKKLKISRQSYK
134
6 matches found in sequence:
P71115 : P-47 protein.
(from "bt_spt.pep")
TOIG of: P71115 check: 9982 from: 1 to: 416

ID P71115 PRELIMINARY; PRT; 416 AA.
AC P71115;
DT 01-FEB-1997 (TrEMBLrel. 02, Created)
DT 01-FEB-1997 (TrEMBLrel. 02, Last sequence update)
DT 01-NOV-1998 (TrEMBLrel. 08, Last annotation update)
DE P-47 protein.
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Langeland NCTC 10281;
RX MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B and F: evidence of chimeric sequences in the gene
RT encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112(1996).
DR EMBL; X96494; CAA65351.1; -.
SQ SEQUENCE 416 AA; 47420 MW; 1B132BE64075EC7D CRC64;

P71115 Length: 416 September 1, 2004 07:07 Type: P Check: 9982
Found using 'seq23' (hayes346.key)

...

21 LKDYITKNKVEFLYSNTDKQEIKNMVFNDWEIINGSSNFIKTPIKGEYFKVNTTID
71 74
81 LSGVNPVLEIKLDFNDISDPNIKLFNGFSNDDIKIIVSDINGNLQEDDEFYFNKL
141 LINAFIQNEKQISYIFASLNVTSDIEMWNPQKPFVYVSTNSDGYLFILSVVTVNRDIS

201	ELSVNVGNIILGNNEVGLLISEKFLKLVLPKLSNMGSDITSNNFKVISTDITGRI	154	187
261	ANNSTLNWYGIKVLWYDPKINNFSMELFEGNKLTSLGIVRLTGYRIYSELNLECT	279	308 312
321	TKTIYDPKKNKTSFEYKYKTSIMSCRPIFGLLDGVPAALVAKSVGDW		
...			

25 matches found in sequence:			
p71117 ; Nontoxic-nonhemagglutinin.			
(from "bt_spt.pap")			
TOIG of: p71117 check: 4166 from: 1 to: 1197			
ID	P71117 PRELIMINARY; PRT; 1197 AA.		
AC	P71117;		
DT	01-FEB-1997 (Tremblrel. 02, Created)		
DT	01-FEB-1997 (Tremblrel. 02, Last sequence update)		
DT	01-OCT-2003 (Tremblrel. 25, Last annotation update)		
DE	Nontoxic-nonhemagglutinin.		
OS	Clostridium botulinum.		
OC	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;		
OC	Clostridium.		
OX	NCBI_TaxID=1491;		
RN	[1]		
RP	SEQUENCE FROM N.A.		
RX	MEDLINE=97016817; PubMed=8863443;		
RA	East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;		
RT	"Organization and phylogenetic interrelationships of genes encoding		
RT	components of the botulinum toxin complex in proteolytic Clostridium		
RT	botulinum types A, B and F: Evidence of chimeric sequences in the gene		
RT	encoding the nontoxic-nonhemagglutinin component.";		
RL	Int. J. Syst. Bacteriol. 46:1105-1112 (1996).		
DR	EMBL; X78230; CAA55074.1; -.		
DR	GO; GO:0008233; F:peptidase activity; IEA.		
DR	GO; GO:0015070; F:toxin activity; IEA.		
DR	GO; GO:0009405; P:pathogenesis; IEA.		
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.		
DR	InterPro; IPR008985; ConA-like lec_gl.		
DR	InterPro; IPR000395; Peptidase M27.		
DR	Pfam; PF01742; Peptidase M27; 1.		
DR	PRINTS; PR00760; BONTOLIXIN.		
DR	ProDom; PD001963; Bontoxilysin; 1.		
SQ	SEQUENCE 1197 AA; 138760 MW; 86062304868CCDB CRC64;		
P71117 Length: 1197 September 1, 2004 07:07 Type: P Check: 4166 ..			
Found using 'seq23' (hayes346.key)			
...			
60	DGGYDSNLSQDSEKFLQAIITLLKRINSTNAGEKLLSLISTAIPFYGGYYA	110	
120	ENMITFGSAPKSNKLNLSISTIPFYAGYRETNVLSSEDNKSFPYASNIVIFGPGANIV	147	
180	ENNTVFYKKEDAENGMTWTEIFQFLLTKYDFEYIDPAIELIKLKSIFLYGIKPS	231	
240	DDLVIPIRLSELENIYSQNLVLLVSGGIDPKFINTDPYWFDTNYSNAKKVFEDHR	257	
300	NIYETQIEGNN		

26 matches found in sequence:

Q08077 ; BONT/B.
(from "bt spt.pep")
TOIG of: Q08077 check: 5240 from: 1 to: 1291

ID Q08077 PRELIMINARY; PRT; 1291 AA.
AC Q08077;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE BONT/B.
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Eklund 17B ATCC25765;
RX MEDLINE=94122659; PubMed=7764370;
RA Hutson R.A., Collins M.D., East A.K., Thompson D.E.;
RT "Nucleotide sequence of the gene coding for non-proteolytic
RT Clostridium botulinum type B neurotoxin: comparison with other
RT clostridial neurotoxins.";
RL Curr. Microbiol. 28:101-110(1994).
DR EMBL; X71343; CAA50482.1; -.
DR FTR; I40631; I40631.
DR HSP; P10845; 3BTA.
DR MEROPS; M27_002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M.Zn_BS.
DR Pfam; PF01742; Peptidase M27; I.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; I.
DR PROSITE; PS00142; ZINC_PROTEASE; I.
SQ SEQUENCE 1291 AA; 150513 MW; 71BCAFE23D69FAAA CRC64;

Q08077 Length: 1291 September 1, 2004 07:07 Type: P Check: 5240
Found using 'seq23' (hayes346.key)

1 MPVTINNFNDPIDNDNIIMPEPPFARGTGRYKAFKITDRIWIIPERYTFGYPEDFN
33 36
34 37

61 KSSGIFNRDVCYEDPDYLTNTDKNI
...

149 ERKKGIFANLIIFGPGVLNENETIDIGIQNHAFSGEGGIMQMKFCPEYVSFNNVOE
199

209 NKGASIFNRGYSFPALILMELIHVLHGLYGIKVDDLPVINEKKFFMQSTDTIQARE

269 LYTFGGQDPSIISPSTDKSIYDKVLQNFGRVDRLNKLVLCISDPNININIKNFKDKY
289

329 KFVDESGKYSIDVSEFNKLYKSLMGLFTEINIAENYKIKTRASYFSDLPVKINLLD
331
349

389 NEITYIEGFINISDKMGKEYRGQNKAINQAYEISKEHLAVYKIQMCKSVKVPICID

449 VDNEFLFIADKNSFSDLSKNERVE 421
...
520 VYEKQPAKKVFTDENTIFOYLYSQTFPLNIRDILSTSFDDALLVSSKVSFSDMDYIK
570
580 TANKVVEAGLFAGNVKQIVDDFVIEANKSSTMOKIADISLIVPIGIALNVGDEDTAKNF
623
640 ESAFEIAGSSILLEFIPELLIPVVGVFLESYIDNKNKIITIDNALTKEVKEWIDMYGL
697
700 IVAQMLSTVNTQFTYTIKEGMYKALNYQAQALEEIIKYKNIYSEEEKSNININFINDINSK
700 720 738
760 LNDGINQAMNDINDFINECSVSYLMKKMIPLA
...
793 KKLLEDFNTLKKNLNVIDENKLYLIGSVEDEKSKVDKYLKTIIPFDLSTYSNIEILIKI
843
853 FNKNSEILNIIILNRLRYRDNLDLSGYGAKVEYVDGVKLDKNQFKLTSSADSKIRVT
888
913 QNQNIIFNSMFLDFSVFWIRPKYRNDIOQNIHNEYTIINCMKNNGWKISIRGNRII
950
973 WTLIDINGKTSVFFEYNIREDISYINRWF
...
1008 TNNLDNAKIYINGTLNESNMDIKDIGEIVNGEITFKLDGVDVDRTOFIWKKYFSIFNTQLN
1058
1068 QSNIKELIYKIQSYSEYKDFWGNPLMYKEYWFMAGNKNYSIKLVKDSVGEILIRSKY
1080 1098 1109
1128 NQNSNYINRYNLVIGEKFIIRRESNSQSINDDIVRKEDYIHLDLVLHHEEWRYAYKPK
1133 1166 1183
1136
1188 EQEKKLFLSIISDSNEFYKTIIEIKEYDEQPSYSCOLLFKKDEESTDDIGLIGIHRFYESSG
1205
1248 VLRKKYKDYFCISKWYLKEVKRKPYSNLGCMNQFIPKDEGWTE
1253 1256

9 matches found in sequence:
q38195 ; ORF22.
(from "bt spt.pep")
TOIG of: q38195 check: 6808 from: 1 to: 179
ID Q38195 PRELIMINARY; PRT; 179 AA.

```

AC Q38195;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF22.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51308.1; -.
DR PIR; S46426; S46426.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22004 MW; 7B51A9D6BA48DBBE CRC64;

Q38195 Length: 179 September 1, 2004 07:07 Type: P Check: 6808 ..
Found using 'seq23' (hayes346.key)

1 MNDLFYAIEKNDQNFHFIEMSLKKYIEKTSKKYMLYDYDNDILYHLWKELIEINLK
36 39 43 46 51
39 42
40 43

61 NFNSELDLRKYISTIKRYCINICKKRNDRKKLIYNSEVYTKKLDANNVSYLDCNFEFL
101
110

121 DLISILNYKEQIILYMKFFEGRKDNEIAIRLRLSRQSIYKIRITSLKKLYPIVMQLVNI
135
170

-----
5 matches found in sequence:
q38196 ; ANTP-33 protein.
(from "bt spt pep")
TOIG of: q38196 check: 8695 from: 1 to: 286

ID Q38196 PRELIMINARY; PRT; 286 AA.
AC Q38196;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ANTP-33 protein.
GN ANTP-33.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51311.1; -.
DR PIR; S46429; S46429.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; RicinB lectin.
DR Pfam; PF00652; RicinB lectin; 6.
DR PROSITE; PS50231; RICIN_B_LLECTIN; 2.
SQ SEQUENCE 286 AA; 33752 MW; 221C2500C8B187EA CRC64;

Q38196 Length: 286 September 1, 2004 07:07 Type: P Check: 8695 ..

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Found using 'seq23' (hayes346.key)

...

42 SGANQKRWLIYDTNKQAYKIKYKMDNTSLILTWAPLSSVSVKTDITNGDNOYWYLLQNYIS
144
92 95

102 RNVIIIRNYMNPVLQVNIIDDTLWVSTQTSSNQFFKFSNCIYEALNNRNCKLQTLQNSD
144
207

162 RFLSKNLNSOIIVLWOWFSSROKWIIEYNETKSAYTLKQENNRXYLTWIQNSNNYVETY
207

222 QSTDSLQIYNNIYNLDNDASKYILYNLQDTRVLDVNSQIANGTHVIVDSYHGNTNQOW
230
243

282 IINLI

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24 matches found in sequence:
q38197 ; ANTP-139 protein.
(from "bt spt pep")
TOIG of: q38197 check: 1897 from: 1 to: 1196

ID Q38197 PRELIMINARY; PRT; 1196 AA.
AC Q38197;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ANTP-139 protein.
GN ANTP-139.
OS Clostridium botulinum phase 1C.
OC Viruses.
OX NCBI_TaxID=35348;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=468;
RX MEDLINE=94301293; PubMed=8028579;
RA Hauser D.F., Eklund M.W., Boquet P., Popoff M.R.;
RT "Organization of the Botulinum neurotoxin C1 gene and its associated
RT non-toxic protein genes in Clostridium botulinum C-468.";
RL Mol. Gen. Genet. 243:631-640(1994).
DR EMBL; X72793; CAA51312.1; -.
DR PIR; S46430; S46430.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec-gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxysin; 1.
SQ SEQUENCE 1196 AA; 138726 MW; 88D5956301FAA491 CRC64;

Q38197 Length: 1196 September 1, 2004 07:07 Type: P Check: 1897 ..
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNFLSQDSERENFLQAIILLKXRNNTISGKQLLSLSTAIPFPYGYIGGGYSS
110

120 PNIPTFGTKPSNKKLNSLVSTIIPFPFGYRETNYIESQNNKNFYASNVIIFPGSGNIV

180 ENNVIIYKKDAENGMTMAEIVFQPLLTYKYNKFVIDPAMELTCKLIKSLFYLYGKIPS
211
231

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240 DNLVVPYRLRLTELNKQFSQNLNIDLLISGGVDLEFINTNPYWFNTSYFFNSIKQKFEYK 298
-|
300 NIKYTELEGNNAIGNDIKRLKQKQFQINQVODIWNLNLYFCQSFNSIIPDRFSNALKHFY 301
-|
360 RKQYTYMDYTDYNYNINQFVNGQINTKLPNSKNTNIIISKPEKVVNLVNNENNISMKSNIIY 363
-|
420 GDGLKGTTEDFYSTYKIPYNEEYERENDSDNPLNNSIEEVDSDIPEIIDINPYKNSD 431
-|
480 NLVFTQITSMTEBVTHTALSYLQAITNENFTLSSDFSKVVSCKDKSLVYSFLDNL 503
-|
540 MSYLETIKNDGPIDTKKYLYLWLKEVPKNYSFDINLTQEIDSMCGINEVVLWFGKALNIL 558
-|
600 NTSNSFVEEYQDSALISLKKDNLRPNIEIDDISLGLGSLFKOLNKLKLYIYSKNIIY 651
-|
660 YFKKIYFSLDQWWTYYYSQYFELICMAKQSIILAQESLVKQIVQNKFTLDSKASIPDDTL 677
-|
720 KLIRETTEKTFIDLSNESQISMRVDNFLNKASICVFVEDIYKFKFSYMEKYINNINIKT 761
-|
780 REFIQRCNTNINDNEKSILINSYTFKTIIDFKFLDIQSIKNFFNSQVEQVMEKILSPYOLL 835
-|
840 FASKGPNISIIEDISKNTLIQYTESIELVYGNGESLYLKSPNETIKF
...
914 DDKTRLIGNKVNKCGWEIYFEDNGLVFEIIDSNGQESVYLSNIINDNWYIYLSIVDRLK 964
-|
974 DOLLIFNDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVIDNPEITSEEVIRNF 1032
-|
1034 SYLDNSYIRDSSKSLLEYKNQYQLNYVFPETPSLYEVNDNNKSYLSLXNTDGINISSVKF 1055
-|
1094 KLINIDESKYVQKWDCEIICVLDGTEKYLDISPENNRIQLVSSKDNAKKITVNTDLFRP 1122
-|
1154 DCITFSYNDKYFSLRQDYNMILCNDNNKVPKGAHLWILES 1164
-|
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6 matches found in sequence:
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q45840 ; 35 kDa hemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45840 check: 1531 from: 1 to: 291

ID Q45840 PRELIMINARY; PRT; 291 AA.
AC Q45840;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-NOV-1996 (TREMBlrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE 35 kDa hemagglutinin component.
GN HEM35/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=lamanna.
RX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL: U24431; AAA99055.1;
DR InterPro; IPR008997; RicinB_like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 5.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 291 AA; 33383 MW; EBCAECB55FFE31E7 CRC64;

Q45840 Length: 291 September 1, 2004 07:07 Type: P Check: 1531
Found using 'seq23' (hayes346.key)

1 MEHYSTIQNSLNDKIVTISCKANTDLFFYQVFGNGVSLFQQTRNYLERWRIIYDSNKA 4
61 YKIKSMNIYNTNLVLTWNPATHNISALQDSNADNOYWLKLDKIGNNSFIASKPNVL 96
121 YADTVARNLKLSTLNNSSYIKFIIEDYVISDFKFTCRISPILAGGKVQVQVSMTNLAVN 139
181 LYIMNDLQKWTIIYNEKAAAYQFPNKILSNGLVTWIFSDGNTVRVSSSAQNDQYWL 203
241 NFVSNYDRYITITNLRYKTKVLVDLYGGQTADGTTIQVENSNGDNQIWIYGL 247

-----
3 matches found in sequence:
q45841 ; 17 kDa hemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45841 check: 5146 from: 1 to: 146

ID Q45841 PRELIMINARY; PRT; 146 AA.
AC Q45841;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-NOV-1996 (TREMBlrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE 17 kDa hemagglutinin component.
GN HEM17/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
```

```

RC STRAIN=lamanna;
RX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL components of Clostridium botulinum type B progenitor toxin.";
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL; U24431; AAA99056.1; -.
DR InterPro; IPR008903; Botulinum_HA-17.
DR InterPro; IPR000772; Ricin_B lectin.
DR Pfam; PF05588; botulinum_HA-17; 1.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 146 AA; 16908 MW; 81D1DA470123B4D6 CRC64;

Q45841 Length: 146 September 1, 2004 07:07 Type: P Check: 5146
Found using 'seq23' (hayes346.key)

...

17 SIFSGSLYSPVSGSLTFSSNESSANNOKWVVEYMAENRCFKISNVAEPNKYLSDNFGFI
67 70
--|
RN

77 SLDSLSRCWFFPIKIAVNTYIMLSLNKNVLDYWDIYDTNENILSQPLLLLPNFDIYN
97 100
--|
RN

137 SNQMFKLEKI

-----
1 match found in sequence:
q45842 ; 70 kDa hemagglutinin component (Fragment).
(from "bt_spt.pep")
TOIG of: q45842 check: 9981 from: 1 to: 42

ID Q45842 PRELIMINARY; PRT; 42 AA.
AC Q45842;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DE 01-DEC-2001 (TrEMBLrel. 19, Last annotation update)
DE 70 kDa hemagglutinin component (Fragment).
GN HEN70/B.
OS Clostridium botulinum B.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OC NCBI_TaxID=36827;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=lamanna;
RX MEDLINE=97031041; PubMed=8876967;
RA Yang G.H., Rhee S.D., Jung H.H., Yang K.H.;
RT "Organization and nucleotide sequence of genes for hemagglutinin
RL components of Clostridium botulinum type B progenitor toxin.";
RL Biochem. Mol. Biol. Int. 39:1141-1146(1996).
DR EMBL; U24431; AAA99057.1; -.
DR NON_TER 42
FT SEQUENCE 42 AA; 4814 MW; 74D27F85CC46CF97 CRC64;

Q45842 Length: 42 September 1, 2004 07:07 Type: P Check: 9981
Found using 'seq23' (hayes346.key)

1 MNSIKKIYNHIOEKVINYSDTIDLADGNVYVSRGSGWILSR
9 12
--|
-----
10 matches found in sequence:
q45843 ; P-47 protein (Neurotoxin complex M component) (Fragment).
(from "bt_spt.pep")
TOIG of: q45843 check: 5199 from: 1 to: 412

ID Q45843 PRELIMINARY; PRT; 412 AA.

```

```

AC Q45843;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-47 protein (Neurotoxin complex M component) (Fragment).
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OC NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=202F;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hielt S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RL proteolytic and nonproteolytic Clostridium botulinum and Clostridium
RL barati.";
RL Curr. Microbiol. 37:262-268(1998).
RN [2]
RP SEQUENCE OF 348-412 FROM N.A.
RX MEDLINE=94297488; PubMed=7764998;
RA East A.K., Collins M.D.;
RT "Conserved structure of genes encoding components of botulinum
RL neurotoxin complex M and the sequence of the gene coding for the
RL nontoxic component in nonproteolytic Clostridium botulinum type F.";
RL Curr. Microbiol. 29:69-77(1994).
DR EMBL; Y10770; CAA71743.1; -.
DR EMBL; S73676; AAC60473.1; -.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1
SQ SEQUENCE 412 AA; 47189 MW; 63CBFAFA642FE5FB CRC64;

Q45843 Length: 412 September 1, 2004 07:07 Type: P Check: 5199
Found using 'seq23' (hayes346.key)

1 YGWDIVYGCNRRVNVKHLKEYINKNQIEFLYSNDVKKQEKIMIFDTWEIINGSSNFLRI
31 34
--|

61 KIPKQGLYKIKKTIYLVNGVTPIEIKLDFNDSDNIHVQLKFNVSVDANIKVIVG
68 71
--|

121 DLSGKMDTEIYFKNLLIKAFIKNVEQVYIFASLNVKSNIEWMNPKKFKFVYSPDTN
151
--|

181 SEGVLFILSVVTVNRDISKLTNVDGNILSNSEVGLLISEKLFQNLALPKLSSNMGSDI
184
--|

241 SGKNEVSSYSDTTAGIYNSSTLWYIKVLWYYPKINSFVLNSYEGNKNKIKVYGRVK
275
--|

301 PTGYIVVADFINSINKFMVDSKNKRAYFEIDKNAKTDKTIYIRPVDLIPAAIINSVY
304 308
--|

361 WSMESIKELGFLQANNFTDIINNIVEWNNIKISEVTNVLNVGFCIOGNMN
363
--|

-----
26 matches found in sequence:
q45844 ; Neurotoxin complex M nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: q45844 check: 1014 from: 1 to: 1165

```

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ID Q45844 PRELIMINARY; PRT; 1165 AA.
AC
DT 01-NOV-1996 (TReMBLrel. 01, Created)
DT 01-NOV-1996 (TReMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TReMBLrel. 25, Last annotation update)
DE Neurotoxin complex M nontoxic-nonhemagglutinin component.
GN NTHN.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=94297486; PubMed=7764998;
RA East A.K., Collins M.D.;
RT "Conserved structure of genes encoding components of botulinum
RT neurotoxin complex M and the sequence of the gene coding for the
RT nontoxic component in nonproteolytic Clostridium botulinum type F.";
RL Curr. Microbiol. 29:69-77(1994).
DR EMBL; S73676; AAC60474.1; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_gl.
DR InterPro; IPR002160; Kunitz legume_.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; I.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00283; SOYBEAN KUNITZ; 1.
SQ SEQUENCE 1165 AA; 136458 MW; 31AE33D8B2DC6C52 CRC64;

Q45844 Length: 1165 September 1, 2004 07:07 Type: P Check: 1014
Found using 'seq23' (hayes346.key)

...

128 SEVLYSANIVIFPGSNIVKNNTIYKKNFAENGMTMAEILFQPLLTVKYNQFYADPAL
178
188 ELIKLAIKAIYFLYGIKPNLNLNIPVRLNFEFSNVEYSELNIIIDFLISGIDYKFTNTP
240
248 YWFIDYFDVPRVFEKHKNDYENIKNNSEIGTSIKLYLEQKFTNVDIMELNLSYFS
248
308 KEFQIMPEKHNALKHYYRKYKYNISKYQYDINGFVNGQIATKLLSEKNQYIINKPQ
330
368 LIINLINKSNLSLLMKSNLYDGLNGTTPDNYRNYKIPDNIAYQHPNNTYLDNVNIEI
399
428 NNIPQITADIYPTNCTPFIPIYNTOSREINTVPYSINYLOSQIMNSDDITLISDF
488 WEVVCNDKSLVYSYLDNVINYLDISKNTPTINTDKYLYLWLKEIFRNSYFDITATEEIT
500 525 526
548 TECGINKIVWFGKALNLTNDNSFKIEFQNSGALINKDNIIPKTEIDEMPNSMLN
608 LSPFDLNLQLYSKNITYFKKIYNYFDQWWTYYSQYFDLICWAKKSILAQENLIKK
618 632 644
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668 IIQKISYLIGASNIPDDILAVMRLLTTNTLRDISVESQIAMNNLNFLNKAAKCVFQSN
633 647
728 IYFIFSPMEQCIKHINKSTKEFTQKCTNINETEKLQIMQNSFSLNDFDLDIQNMKNL
729
788 FNSYTELLIKEQTSFYELSLYAFEEQDNNVIGDASGKNTLVEYFKGIELVYGINNSALYL
791
848 NGSNQSIIFTNDYFENGILNFSFYFWLRNLGQDTIKSLIGSKEYNCGWEIYFQEIGHV
872
908 FNMIDSNNGEKNIYLVDSVNSNWHYITISVDRLKEQLLI FIDDLNVVNESIKDILNIYSS
932
968 NIISLSDNKSAYIEGLTILNKPTTGEEVLNRYFKNLNNSYVRDSNDERLEYNKTYQLYD
1023 1026
1028 YVFPDNPICEVKQDNNIYLTINNINNLNMPCKFKLLSINSNKQYVQKDEVIISVLYDT
1045
1088 EKVCISNENNRVKIIDNKIMQVKFIISNDIFISNCLTHAHNNKYICLSMKDENYWMIC
1090 1132 1142
1148 NNESNIPKAYLWILKEV
1158

-----
2 matches found in sequence:
q45845 ; ADP-ribosyltransferase C3.
(from "bt_spt.pep")
TOIG of: q45845 check: 6064 from: 1 to: 244

ID Q45845 PRELIMINARY; PRT; 244 AA.
AC Q45845;
DT 01-NOV-1996 (TReMBLrel. 01, Created)
DT 01-NOV-1996 (TReMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TReMBLrel. 24, Last annotation update)
DE ADP-ribosyltransferase C3.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=94041658; PubMed=8225604;
RA Moriishi K., Syuto B., Saito M., Oguma K., Fujii N., Abe N., Naiki M.;
RT "Two different types of ADP-ribosyltransferase C3 from Clostridium
RT botulinum type D lysogenized organisms.";
RL Infect. Immun. 61:5309-5314(1993).
DR EMBL; D17555; BAA04492.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0016740; F:transferase activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003540; Binary toxinA.
DR Pfam; PF03496; Binary_toxA_1.
DR Transferase.
KW Transferase.
SQ SEQUENCE 244 AA; 27406 MW; 08A382AA8AD43E8 CRC64;
```

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Q45845 Length: 244 September 1, 2004 07:07 Type: P Check: 6064 ..
Found using 'seq23' (hayes346.key)

...

13 LSAGVIAPVTTISVQSPQKCYACTVDKGSYADTFTEFTNVEAKWGNAAOYKKGLSKPE
    |---|
    63 66

73 QEAIKFYTRDASKINGPLRANQNGENGLSSDILQKVKLIDQSFS
    |---|

...

120 MPQNIILFRGDEPAYLGPFDQKILNKDGTINRDVFEQVAKFLKKDRTHYGYISTSLMS
    |---|
    170

180 AQFGRPIVTKFTNGSKGYIDPISVFPQGLVLLPRNNSYY
    |---|

...

5 matches found in sequence:
q45846 : Botulinum neurotoxin type B (fragment).
(from "bt_spt.pep")
TOIG of: q45846 check: 4449 from: 1 to: 361

ID Q45846 PRELIMINARY; PRT; 361 AA.
AC Q45846;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type B;
EX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70814; CAA50145.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_lec_gl.
KW Neurotoxin.
FT NON_TER 1 361
FT NON_TER 361
SQ SEQUENCE 361 AA; 42175 MW; 533EA98735CD98E1 CRC64;

Q45846 Length: 361 September 1, 2004 07:07 Type: P Check: 4449 ..
Found using 'seq23' (hayes346.key)

...

14 GSSILLEFIPELLIPVGVFLLESYIDNKNKIITIDNALTKEVKEKWMIDWYGLIVAQWLS
    |---|
    64 67

74 TVNTQFYTIKEGMYKALNYQAALEELIKYKINYISSEKSNININFNINSKLINEGINQ
    |---|
    87 90
    105

134 AMDNINDFINECSVYIMKKMPLA
    |---|

...

```

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205 FDLSMYTNNEILLIKIFKNYNSEILNIIILNRYDRNNLIDLSGYGAKVYVDGVLNDKN
    |---|
    255

265 QFKLTSSADSKIRVTQNIIFNSMFLDSVSPWIRPKYRNDDIQYIHNEYTIINCMK
    |---|
    317

325 NNSGWKISIRGNRIIWTLIDINGKTKSVFFEYNIRED

-----
7 matches found in sequence:
q45847 : C2 toxin (Component-I).
(from "bt_spt.pep")
TOIG of: q45847 check: 9343 from: 1 to: 431

ID Q45847 PRELIMINARY; PRT; 431 AA.
AC Q45847;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE C2 toxin (Component-I).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96184657; PubMed=8645309;
RA Fujii N., Kubota T., Shirakawa S., Kimura K., Ohishi I., Moriishi K.,
RA Isogai E., Isogai H.;
RT "Characterization of component-I gene of botulinum C2 toxin and PCR
RT detection of its gene in clostridial species.";
RL Biochem. Biophys. Res. Commun. 220:353-359(1996).
RN [2]
RP SEQUENCE FROM N.A.
RX MEDLINE=98323874; PubMed=9659689;
RA Kimura K., Kubota T., Ohishi I., Isogai H., Isogai E., Fujii N.;
RT "The gene for component-II of botulinum C2 toxin.";
RL Vet. Microbiol. 62:27-34(1998).
DR EMBL; D63903; BAA09942.1; -.
DR EMBL; D88982; BAA32536.1; -.
DR PIR; JC4692; JC4692.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003540; Binary toxinA.
DR Pfam; PF03496; Binary toxinA; 1.
DR PRINTS; PR01390; BINARYTOXINA.
SQ SEQUENCE 431 AA; 49403 MW; A1754F6A0849B0C0 CRC64;

Q45847 Length: 431 September 1, 2004 07:07 Type: P Check: 9343 ..
Found using 'seq23' (hayes346.key)

...

51 TKIDNFSTDILFSSLTATIEIMKEDENQNLDFVERIREALLKNTLDREVYGVNFPFKELG
    |---|
    101

111 INFSTRDVELNRDISDEILDKVRQIINQETKTFVSVSLGLNDNSIDESIPVIVKTRVPT
    |---|
    141

171 TENVGLVNKKTETVSLLNQGFSIIPESAIITTKGDIYTLIEGLSQELDFYNGSEAWG
    |---|
    174
    208

231 EKNYGDYVSKLSQEQIQAEGYLHSDYKALNSYLRNRRVNPNDLAKKIELISSALSVPK
    |---|
    234
    257

291 IPETLIAYRVDGIPFDLPDSDFDKKENGELIADTKLNEFDKWTGKEIENLSFSSTS
    |---|

```

298

351 L

...

5 matches found in sequence:q45848 ; Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")

TOIG of: q45848 check: 4700 from: 1 to: 361

ID Q45848 PRELIMINARY; PRT; 361 AA.
AC Q45848;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type B;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70819; CAA50150.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_1ec_gl.
KW Neurotoxin.
FT NON TER 1 1
FT NON TER 361 361
SQ SEQUENCE 361 AA; 42131 MW; A2E0FFC81F9533D CRC64;

Q45848 Length: 361 September 1, 2004 07:07 Type: P Check: 4700 ..
Found using 'seq23' (hayes346.key)

...

14 GSSILLEFPELLIPVGVFLLESYIDNKNKIKTIDNALTNRKVEKWIDMYGLIVAQWLS
64 67

74 TVNTQFYTIKGMKALNYQAQALEBIIKVKNIYSEEEKSNININFNDSKINDGNG
87 90 105

134 AMDNINDFINECSVSLMKMPLA

...

205 FDLSTYTNNEILLIKIFKNYSBILANNIILNRYDRNLLIDLSGYGAKVEYDGVKLDKN
255

265 QPKLTSSADSKIRVTQNONIIFNSMFLDPSVFWIRIPKYNDDIQNIYHNEYTIINCK
317

325 NNSGKWSIRGNRIIWTLLIDNGTKSVFFEVNIRED

27 matches found in sequence:

q45849 ; Neurotoxin.

(from "bt_spt.pep")

TOIG of: q45849 check: 1922 from: 1 to: 1280

ID Q45849 PRELIMINARY; PRT; 1280 AA.
AC Q45849;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
OS Clostridium botulinum C.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=36828;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=6813;
RX MEDLINE=96156810; PubMed=8593068;
RA Morishi K., Koura M., Fujii N., Fujinaga Y., Inoue K., Syuto B.,
Oguma K.;
RT "Molecular cloning of the gene encoding the mosaic neurotoxin,
composed of parts of botulinum neurotoxin types C1 and D, and PCR
detection of this gene from Clostridium botulinum type C organisms.";
RL Appl. Environ. Microbiol. 62:662-667(1996).
DR EMBL; D49440; BAA08418.1; -.
DR PIR; A43503; A43503.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_1ec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M.Zn_BS.
DR Pfam; Pf01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIDYISN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147815 MW; 74F813B228B8C989 CRC64;

Q45849 Length: 1280 September 1, 2004 07:07 Type: P Check: 1922 ..
Found using 'seq23' (hayes346.key)

...

58 LNKPPRTSPKSGYDPNYLSTDSEKDTFLKELIKFLKRNRSRGEELIYRLATDIPFP
108

118 GNNNTPTINTFDVDFNSVDVKTRQGNWVKTGTSNPVSIIITGPRENIIDPETSTFKLTN

178 NTFAAQEGFGALSIISIPRFLMTYSNATNNVGEGRFSKSEFCMDPILILMELNHTMFN
202

238 LYGAIAPNDQRISSVTSNIFYSQYKVKLEYABIIYAFGGPTIDILPKSGRKYFEKALDY
239 258 267 297

298 RSIARLNSITTANPSSFNKYIGEYKQKLIRKYRFVSSGEVAVDRNKFALYKELTQI
300 330 351

358 FTEFNKYKYNQNRKIYLSNVYPTVTANILLDDNVYDIQNGFNIPKSNLNVLFMGQNLNR
363 380

418 NPALRKVPENMLYLF

...

466 IGDISDKTDIFLSKDINVEFVIDYPDNVSVDQVILSKNTSEHQDLDPYPIEGESQV
108

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526 LPGENQVFDNRQNTQNDVLYNSYTYLESQKLSNDVEDFTFTTSIEEALDNGSKVYTPPKL 579
      |---|
      |---|
586 ADKNTGVQGGELFMWANDVVEFTTNILRKDTLDKISDYSAAIPIYGIPALNISVRRE 705
      |---|
      |---|
646 NFTEAFVGTGVTILLEAFQEBFTIPALGAFVIYSKVQBRNEIITKDIDNCLQRIKRWDSY 705
      |---|
      |---|
706 EWMIGTWLSRITTFQPNISYOMYDSLNYQADAIKDKIDLEFKYSGGDKENIKSQVENLK 746
      |---|
      |---|
725 725
766 NSLDIKISEAMNNINKFIRECSVTYLPKNMLPKV
...
878 NKKNALVDTSGYNAEVRLEGVQVNTIYTNDFKLSSGDKIIVNINNLLIYSAIYENS 928
      |---|
      |---|
938 SFWIKISKDLTNSHNEYTIINSIKQNSGWKLCIRNGNIEWILQDINRKYKSLIFDYS 986
      |---|
      |---|
998 SHTGYTNKWFVTITNNIMGWKLYNGELKQSERIEDLNEVKLDKTIYFGIDENIDNQ 1018
      |---|
      |---|
1058 MLWIRDFNIFSKELSNEDINIVYEGQILLNRVIKDYGNPLKFDTEYIINNDYIDRYIAP 1103
      |---|
      |---|
1118 KSNILVLVQYPRDSKLYTGNPTIKSVSDKNPYRILNGDINMFHMLYNSGKWIIRD 1170
      |---|
      |---|
1178 TIYATEGRECSKNVYALQSLNGYIGIFSIKNIVSQNKYCSQIFSSFMKNTMLLAD 1150
      |---|
      |---|
1238 IYKPRFRSFENAYTPVAVNTYETKLLSTSTSFWKFIISRDPGWVE 1250
      |---|
      |---|
-----
26 matches found in sequence:
q45850 ; NTN protein (Nontoxic-NONHAEMAGGLUTININ) (Partial P-21 gene AND P-47
(from "bt_spt.pep")
TOIG of: q45850 check: 5199 from: 1 to: 1163

ID Q45850 PRELIMINARY; PRT; 1163 AA.
AC Q45850; P711116;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-MAY-1999 (TREMBlrel. 10, last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, last annotation update)
DE NTN protein (Nontoxic-NONHAEMAGGLUTININ) (Partial P-21 gene AND P-47
DE gene) (Strain LANGELAND NCTC 10281).
GN NTN.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RN SEQUENCE FROM N.A.
RC STRAIN=LANGELAND;
RX MEDLINE=98404102; PubMed=9732534; Collins M.D.;
RA East A.K., Bhandari M., Hiem S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic and nonproteolytic Clostridium botulinum and Clostridium
```

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barati.";
Curr. Microbiol. 37:262-268 (1998).
[2]
RN SEQUENCE OF 1108-1163 FROM N.A.
RP Elmore M.J., Bodsworth N.J., Whelan S.M., Minton N.P.;
RA Submitted (AUG-1994) to the EMBL/GenBank/DBJ databases.
[3]
RN SEQUENCE OF 1-66 FROM N.A.
RP STRAIN=LANGELAND NCTC 10281;
RC MEDLINE=97016817; PubMed=8863443;
RA East A.K., Bhandari M., Stacey J.M., Campbell K.D., Collins M.D.;
RT "Organization and phylogenetic interrelationships of genes encoding
RT components of the botulinum toxin complex in proteolytic Clostridium
RT botulinum types A, B, and F: evidence of chimeric sequences in the gene
RT encoding the nontoxic nonhemagglutinin component.";
RL Int. J. Syst. Bacteriol. 46:1105-1112 (1996).
DR EMBL; X99064; CAA67511.1; --
DR EMBL; X35496; AAA23209.1; --
DR EMBL; X96494; CAA65352.1; --
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec.gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxilysin; 1.
DR SEQUENCE 1163 AA; 135134 MW; DC6F8EDD35AFF565 CRC64;
SQ
Q45850 Length: 1163 September 1, 2004 07:07 Type: P Check: 5199
Found using 'seq23' (hayes346.key)
...
81 ATVKILQRNNNVIGAKLLSLISTAIPTFFYKPGDYRTNVLVSKDNQHYVTANLVIFG 131
      |---|
      |---|
141 PGTNIVENNAVYKKEDSENGMTMSEIWFQPLTYKYDQFYVDPALELIKCLIKSLYL 198
      |---|
      |---|
201 YGIKPSDDLSPYRLRSELNLSKYSLEMDVDFLISGGTDYKLTNTNFWVTNDFSDAPK 240
      |---|
      |---|
261 NFEKYKNDYETKIKNNNDIANSIKLYLEQKPKINAQDIWELNLSYLSTFEIMMPEIFNN 240
      |---|
      |---|
321 ALNHYHRKEYVYIDYFKYNNINGFINGQIKTILPLSKYNNKIINKPELIVNLINNSVL 330
      |---|
      |---|
381 MKSNVYDGLKGTMMNFYAVYKIPYNIQDEYHINYSYLVANNVVEEINNIPPINDADIYPY 398
      |---|
      |---|
441 RKNSDFFIPVYNITETKEINTTTPLSVNYLOAQVNTNSNDINLSDFSIVLSKDRSLVYS 469
      |---|
      |---|
501 FLNNTIDYLDISKYDRFINTDKKYKWLKLEIFRNYSFDMTEIQEIVNPGINKVVPWLGG 524
      |---|
      |---|
561 ALNILNTGNSFIEEFKYL 525
      |---|
      |---|
...
```



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581 ISLKNKENIIMPKEIDEIPNMLNLSFKDLSENLFNFSKNNSYFEKIYYDFLDQWWT
    631
    632
641 QYISOYFLICMAKESVLAQESLIKKIIQKKLSYLIGNSISADNLVLMNLTTNTLRDI
    643
    646
701 SNESIAMNNVDSEFLNSAAICVFEGNIYIPKFTSFMEQCINNKNTRBFIQKTNITENE
    728
761 KLQLINRNIFSSLDPLNLENKLSLFSSETALLIKESTSYELVLYAFQRPDDNNAIGDA
    802
821 SAKNTSEYSKIDIDLVYINGDALYNGANQISFSNDFENGLTNSFSIYFWLNLGKD
    871
881 TIKSKLIGSKEDNCWEIYFQDTGLVFNMDNSGNEKNIYLSVSNNSWHYITISIDRLK
    931
941 EQLLIFIDDLNVNSESKEILNIYSSNLSLSLNNNASYIEGLTILNKPPTSQEVLSNYF
1001 KNLNNSVIRDSNEERLEYNKTYQLYNYVFSFENPIYEIKQNNNIYLTNTNTNMLNQASKF
    1022
    1025
1061 KLLSINPNKHQVQFDEVIISLDNMEKYIDISDNLQLIDNKNKGAKMIISNIFIS
    1089
1121 CLTSLCGGKYICLSKMDENYNNMLCNNSNIPKAYLWTLKEV
    1130
    1140
-----
8 matches found in sequence:
q45861 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q45861 check: 184 from: 1 to: 367

ID Q45861 PRELIMINARY; PRT; 367 AA.
AC Q45861;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type E;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70818; CAA50149.1; -.
DR PIR; S48106; S48106.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; Cona_like_lec_gl.
KW Neurotoxin.

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FT NON_TER 1
FT NON_TER 367
SQ SEQUENCE 367 AA; 42902 MW; 346A610C2FF70262 CRC64;

Q45861 Length: 367 September 1, 2004 07:07 Type: P Check: 184
Found using 'seq23' (hayes346.key)

...

17 ILLEPEPELLIPTILVFTIKSLGSSDNKNKVIKAINNALKERDEKWEKVFIVSNWMT
    67 70
77 KINTQFNKRKEQMYCALQNVNAIKTIIESKYNSYTLBEKNELTNKYDIKQIENELNQKV
    90 93
    108
137 SIAMNNIYRFTESSISYLMKLINEVKINKLREYDENVKTYLLNVIHQHGSILGESQOEL
    144
197 N
...
240 MRYKNDKYVDTSGYDSNININGDVYKPTNKNQFGIYNDKLSSEVNSIQNDYIIYDNKYKN
    290 297
300 FSTSFVWRIPRYNDKIYVNVNEXITIINCMRDNNSGWKSVLNHNHIIWTLQDNAGINQKLA
    322
360 FNYGNANG
    362
-----
7 matches found in sequence:
q45862 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q45862 check: 9554 from: 1 to: 367

ID Q45862 PRELIMINARY; PRT; 367 AA.
AC Q45862;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type E;
RX MEDLINE=94013372; PubMed=8408542;
RA Campbell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262(1993).
DR EMBL; X70815; CAA50146.1; -.
DR PIR; S21178; S21178.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; Cona_like_lec_gl.
KW Neurotoxin.
FT NON_TER 1
FT NON_TER 367
SQ SEQUENCE 367 AA; 42954 MW; 0810595B3A865570 CRC64;

Q45862 Length: 367 September 1, 2004 07:07 Type: P Check: 9554

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Thu Sep 2 08:56:12 2004

Found using 'seq23' (hayes346.key)

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17 ILLEFPELLIPTILVETIKSFLGSSDNKNKVIKAIINNAKLERDEKWEVYSFIVSNWMT
    |---|
    67 70

77 KINTQFNKRKEQMYALQNVNAIKTIIESKYNSYTLLEKRNELTKYDIKQIENELNOKV
    |---|
    90 93

137 SIAMNNIDRFLTESSISYLMKLINE
    |---|
    108

240 MRYKNDKYVDTSGYDSNININGDVYKPTNKNQGIYNDKLVSENVISQNDYIYDNKYKN
    |---|
    290 297

300 PSISFWVRIPNPNYNDKIVNVNNEYTIINCVRDNNNGKVSLSNHNELIWTLODNAGINQKLA
    |---|
    322

360 FNYGNANG
    |---|
    362

7 matches found in sequence:
q45867 ; P-21 protein.
(from "bt_spt.pep")
TOIG of: q45867 check: 4271 from: 1 to: 179

ID Q45867 PRELIMINARY; PRT; 179 AA.
AC Q45867;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE P-21 protein.
GN Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=17B;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
DR EMBL; X79103; CAA55713.1; -.
DR PIR; S58856; S58856.
DR InterPro; IPR009043; RNA_pol_sigma.
DR PROSITE; PS009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 21795 MW; 6B5A33D1A11E092A CRC64;

Q45867 length: 179 September 1, 2004 07:07 Type: P Check: 4271
Found using 'seq23' (hayes346.key)

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1 MNKFLQIKRLKNDNREFQIFKNFEXTIDIFTRKYNIDYNDYLDLHWLTKKVDLSN
    |---|
    36 39 42 45 50

61 FNTQNDLERYISRTLKRYCYLDCINCRKIDKIIYNSEIVEGKRLIANSYSSVEVEFND
    |---|
    110 113

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121 LISILPDDQKKIYMKFVDEIKEDIAKLINISRSQSVYKMKIMALGRLKPLVYIFKFP
    |---|
    134

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7 matches found in sequence:
q45868 ; HA-33 protein.
(from "bt_spt.pep")
TOIG of: q45868 check: 4016 from: 1 to: 292

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ID Q45868 PRELIMINARY; PRT; 292 AA.
AC Q45868;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=17B;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
DR EMBL; X79103; CAA55714.1; -.
DR PIR; S58857; S58857.
DR InterPro; IPR008997; RicinB_like.
DR InterPro; IPR000772; RicinB_lectin.
DR Pfam; PF00652; RicinB_lectin; 5.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS0231; RICIN B LECTIN; 2.
DR PROSITE; PS0231; RICIN B LECTIN; 2.
SQ SEQUENCE 292 AA; 33681 MW; 8B19A0B20FFEDB6E CRC64;

Q45868 length: 292 September 1, 2004 07:07 Type: P Check: 4016
Found using 'seq23' (hayes346.key)

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1 MEHYSVQNSLNDIEVITISCKADTNLFYQTVGNVSLFOQTRNLYERWRLIYDANKAAYK
    |---|
    4 7

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61 IKSMDSHTNLVLTWNAPTHNISAQODSNADQYMLLLKIDGNSFIASYNPNLVLIA
    |---|
    94 97

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121 DTVARNKLSTLNNSSYIKFIEDYIMISDFNNTCKISPLDSSKVVQVAMTDLVSNLY
    |---|
    137

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181 TWIDYGRNQKWTIKYNKEKSAQYQFFNTILSNGLVLTWISSNGNTVRVSSIAQNNDQAWLIN
    |---|
    201

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241 PVSNAYETITNLHDTTKALDLYNSQTANGTTIQVNVHGDNDQKWFIRNP
    |---|
    246

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6 matches found in sequence:
q45871 ; HA-33 protein.
(from "bt_spt.pep")
TOIG of: q45871 check: 2603 from: 1 to: 293

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ID Q45871 PRELIMINARY; PRT; 293 AA.
AC Q45871;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33 OR HA33.
OS Clostridium botulinum.

```

```

OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7272;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
RT type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; X79104; CAA55718.1; -.
DR EMBL; AF461538; AAM75951.1; -.
DR EMBL; AF461540; AAM75958.1; -.
DR PIR; S58861; H44644.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin_B_lectin.
DR Pfam; PF00652; Ricin_B_lectin; 5.
DR PROSITE; PS50231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 293 AA; 33872 MW; C140FE3B29058090 CRC64;

Q45871 Length: 293 September 1, 2004 07:07 Type: P Check: 2603 ..
Found using 'seq23' (hayes346.key)

1 MEHYISVNSLNDKIVTISCKADTNLFYQVAGNVSLFQQTRNVLWRWLIYDSNKAAYK
4 7
61 IKSMDIHNTNVLVTWAPTHNISTQDSNADNQYLLKDKIGNNSFIASYNPNLVLYA
94 97
121 DTVARNKLSTLNNSNYKIFIEDYIISLNNFTCKISPLDLNKVVQVDVTLNVLNLY
137
181 TWYGRNQKWTIRYNEEKAAYQFPNTILSGVLTFISNGTNRVSVSSNDQNDQAQYWL
201
241 NPVSDDTYTITNLDDTTKALDLYGGQTANGTAIQVFNVHGDDNQKWN
137

7 matches found in sequence:
Q45874 : (NCTC 7273).
(from "bt_spt.pep")
TOIG of: Q45874 check: 2384 from: 1 to: 178

ID Q45874 PRELIMINARY; PRT; 178 AA.
AC Q45874;
DT 01-NOV-1996 (TREMBLrel. 01, Created)
DT 01-NOV-1996 (TREMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)
DE (NCTC 7273).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7273;
RA East A.K., Stacey J.M., Collins M.D.;
RL Syst. Appl. Microbiol. 17:306-312(1994).
RN [2]

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RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
RT complex in a strain of Clostridium botulinum producing type B and F
RT neurotoxins.";
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; X79102; CAA55709.1; -.
DR EMBL; Y13630; CAA73966.1; -.
DR PIR; S58864; S58864.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 178 AA; 21653 MW; A82093626DEDB666 CRC64;

Q45874 Length: 178 September 1, 2004 07:07 Type: P Check: 2384 ..
Found using 'seq23' (hayes346.key)

1 MNKLFLOIEMLKNDNEEFQEIFKHFEKTINIFTRKYNINYNDILYHLVWTLKKVDLSN
36 39 42 45 50
39 42
61 FNTQNDLERYISRLKRYCLDICNKRKIDKIIYNSIADKKLSLIANSYSSYEPEFND
110 113
121 LISILPDDQKKIYMKFVEDIKEDIDIAKLNISRSQSVYKNKIMALERLEPILKKLINM
134

6 matches found in sequence:
Q45875 : HA-33 protein.
(from "bt_spt.pep")
TOIG of: Q45875 check: 3005 from: 1 to: 294

ID Q45875 PRELIMINARY; PRT; 294 AA.
AC Q45875;
DT 01-NOV-1996 (TREMBLrel. 01, Created)
DT 01-NOV-1996 (TREMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 7273;
RA East A.K., Stacey J.M., Collins M.D.;
RT "Cloning and sequencing of a hemagglutinin component of the botulinum
RT neurotoxin complex encoded by Clostridium botulinum types A and B.";
RL Syst. Appl. Microbiol. 17:306-312(1994).
DR EMBL; X79102; CAA55710.1; -.
DR PIR; S58865; S58865.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin_B_lectin.
DR Pfam; PF00652; Ricin_B_lectin; 5.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS50231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 294 AA; 33652 MW; 55A628626934C23D CRC64;

Q45875 Length: 294 September 1, 2004 07:07 Type: P Check: 3005 ..
Found using 'seq23' (hayes346.key)

1 MEHYSTIQLNDKIVTISCKANTDLFFYQVGNVSLFQQTRNVLWRWRIYDSNKA
4 7

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61  YKIKSMIYNTNLVLTWNPAPHNISAQDSNADNQWLLKLDIGNNSFIITASYKNPNLVL
    |---|
    96 99

121  YADTVARNLKLSTLNNSYIKFIEDYVISDFKNFTCRISPILAGGKVVQVSMNLAVN
    |---|
    139

181  LYIWNNDLNQWTLIYNNEKAAQOFNKILNSGLVLTWIFSDGNTVRVSSAQNNDADQWYL
    |---|
    203
    238

241  INPVDNYDRYTTINLRDXTKVLDDYGGQADGTTIOVFNSNGGDNIWTMSNP
    |---|
    241 248

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17 matches found in sequence:
q45877 ; Ha70 protein.
(from "bt_spt.pep")
TOIG of: q45877 check: 348 from: 1 to: 626

ID Q45877 PRELIMINARY; PRT; 626 AA.
AC Q45877;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Ha70 protein.
GN HA70
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
  Clostridium botulinum strain NCTC 2916."
RL FEMS Microbiol. Lett. 140:151-158 (1996).
DR EMBL; L42537; AAB42187.1; -
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0045070; P:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
DR SEQUENCE 626 AA; 71251 MW; E499C0170B21D4DA CRC64;
SQ SEQUENCE 626 AA; 71251 MW; E499C0170B21D4DA CRC64;

Q45877 Length: 626 September 1, 2004 07:07 Type: P Check: 348
Found using 'seq23' (hayes346.key)

1  MNSSIKYNDIQEKVINYSDTIDLADGNVVRVRRGDWILSRQNLIGGSVISNGSTGIV
    |---|
    9 12

61  GD

...

68  NAIPYYPTSPNEEYIKNNIQVFTNFTNANQIPIGFESKTPAPSKNLYWYLOYTYIR
    |---|
    116 123
    120 125

128  YEITKVLQHEIIRAVLYVPSLGVVKSIEFNPGEKINKDPFYFLTNDKCIINEQFLYKKIL
    |---|
    128
    128

188  ETTKNIPTNNIFNSKVSSTQRLPYSLNGLYVINKGDGYIRTDKDLTGT

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...

260  FTTSNDTKFSQQYTEERLKDANVQLFNTSTSLFKFVEEAPSDKNICKAYNTYEKVELI
    |---|
    310 316
    313

320  DYQNGSIVNKAEEYLLSLGCEVTNAPSPSEVVVKQVQAEFGFQNGPEEEIVVGVDPDS
    |---|
    339

380  ENIQEINTALSDNYTNIPIGVVNNPPYILFTVNTTGIYKINTQNNLPPLKIVAIQSGN
    |---|
    407
    432

440  RNLQAGNLCNNNIKAINYITGVDDPNTKSYLVLLNKKDKNYIRVQPTSPNIENQIKFKR
    |---|
    469
    481

500  EGDRLNMSSVNIIDNLNSTGAHYVTROSPDVGNYISYEFTVPGFNFNKDTGSRILYI
    |---|
    536

560  SNNQIGITLFRVIETIDYKILGIRQNLHLNLTNTSIRLLNGAIYILKVEVTELNNNYIR
    |---|
    578

620  LHIDITN

-----
3 matches found in sequence:
q45878 ; HA17.
(from "bt_spt.pep")
TOIG of: q45878 check: 5199 from: 1 to: 146

ID Q45878 PRELIMINARY; PRT; 146 AA.
AC Q45878;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA17.
GN HA17 OR HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
  Clostridium botulinum strain NCTC 2916."
RL FEMS Microbiol. Lett. 140:151-158 (1996).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=97677110;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
  complex in a strain of Clostridium botulinum producing type B and F
  neurotoxins."
RL Curr. Microbiol. 37:312-318 (1998).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
  type A strains."
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; L42537; AAB42188.1; -
DR EMBL; Y13630; CAA73964.1; -
DR

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DR EMBL; AF461538; AAM75950.1; -.
DR EMBL; AF461540; AAM75957.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR Pfam; PF05588; botulinum HA-17; 1.
SQ SEQUENCE 146 AA; 17034 MW; 5B0E7C17041F85E1 CRC64;
Q45878 Length: 146 September 1, 2004 07:07 Type: P Check: 5199
Found using 'seq23' (hayes346.key)
...
17 SIFGSLYLPVSKSLTFSNESSANNOKWVYMAENRCFKISNVAEPNKYLSYDNFGFI
    |---|
    67 70
    70 73
77 SLDSLSNRCYWFPIKIAVNTYIMLSLNKVNELDYAWDIYDTNENILSQPLLLLENFDIYN
    |---|
    97 100
137 SNQMKLEKI
-----
7 matches found in sequence:
Q45879 ; ORFX.
    (from "bt_spt.pep")
TOIG of: Q45879 check: 2438 from: 1 to: 178
ID Q45879 PRELIMINARY; PRT; 178 AA.
AC Q45879;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORFX.
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
    Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
    Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
    neurotoxin gene clusters in Clostridium botulinum type A(B) strain NCTC
    2916.";
RL Curr. Microbiol. 36:226-231(1998).
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RX Rodriguez Jovita M.;
RA Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
RL EMBL; I42537; AAB42190.1; -.
DR EMBL; Y14239; CAA74633.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 178 AA; 21652 MW; F8275479DCF8606B CRC64;
Q45879 Length: 178 September 1, 2004 07:07 Type: P Check: 2438
Found using 'seq23' (hayes346.key)
...
1 MNKLFLOIKMLKDNBERFQEIFKHFEKTNITFRKYNIDYNDILYHLWYTLKKVDLSN
    |---|
    36 39 42 45 50
61 ENTQNDLERYISRTILKRYCLDLCNKRKIDKKIYNSEIADKKLSLIANSYSSYSEFFND
    |---|
    110 113
121 LLSILPDDQKKIYMKFVEDIKEIDIAKKNLSRQSVYKKNIMALERLEPILKLIIN
    |---|
    134
-----
28 matches found in sequence:
Q45880 ; NtnhA protein.
    (from "bt_spt.pep")
TOIG of: Q45880 check: 4779 from: 1 to: 1193
ID Q45880 PRELIMINARY; PRT; 1193 AA.
AC Q45880;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE NtnhA protein.
GN NtnhA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96291660; PubMed=8764477;
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RT "Genetic characterisation of the botulinum toxin complex of
    Clostridium botulinum strain NCTC 2916.";
RL FEMS Microbiol. Lett. 140:151-158(1996).
DR EMBL; I42537; AAB42191.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1193 AA; 138201 MW; 16C0A4760B7E9C76 CRC64;
Q45880 Length: 1193 September 1, 2004 07:07 Type: P Check: 4779
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFLSQDSEKDFLOQAIITLLKRINSTNAGEKLLSLISTAIPFPYGYIGGYVA
    |---|
    110
120 FNMITFGAPKSNKKLSLISSTIPFPYAGTRETNYLSSSDNKGFSYASNIVIFGPGANIV
    |---|
    147
180 ENNTVFYKKEDAENGMGMTWEIWFQPFITYKYDEFYIDPAIELIKLKLSYFLYGIKPS
    |---|
    211 231
240 DDLVIVPLRSLSENIENISQNLNIVDLLVSGGIDPKFINTDPYFIDNYSNAKKVFEDHR
    |---|
    257 281
300 NIYETEIGNNAIGNDKLRLLKQKFRININDIWEIENLNYSKFSIMMPDRFNALKHFY
    |---|
360 RKQYKIDYPENSYNGFVNGQINAQLSLSDRNQDIINKPEEIIINLNGNNVLSMRNIY
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363
420 GDGLKSTVDVDFYSNYKIPYNRAYEYHFNNNSDLSLDNVNIGVIDNTPETIDVNPYKENC
431 438
480 KFSPOKITSTREINTNIPWPNYLAQNTNNEKFSLSDFVEVWSKDKSLVYSLSNV
503 533
540 MFYLDISIKNSPIDDKKYLWLRREIPRNYSFDTATQETINTDOGINKVTFWFGKALNIL
558 559
600 NTSDSFVEEFQNL
...
615 ISLINKKENLSPKXIEIDETPNMNLNLSFKDLSENLFNIFSKNNNSYFEKYYDFLDQWWT
665 666
675 QYYSQYFDLICMAKRSVLAQESLIKKIQQKLSVYLIGNSISDNLALMNLTTNTLRLDI
677 680
735 SNESQIAMNNVNNFNINVAICVFQNIYPKFISFMEQCINNINKNTREFIOKCTNITENE
762
795 KLQLINQNFSSLDPDFLNIENLKSFLNSETGLLIKEETSPYELVLYAFQBPNGNAIGDA
836
855 SGKNTSIEYSKDIGLVYGINRDALYNGSNQSIQSFNDFFENGLTNSFSIYFWLRLNGKD
905
915 TIKSKLIGSKEDNCGWEIFYQDTGLVFNMDNSNGEKNIYLSDVNSNSWHYITISVDRLK
965
975 EQLLIFIDNLVANESIKEILNIYSSNTISLVNENNPYVEGLSILINKPFTTSQEVLSNYF
1033
1035 KVLNNSYIRDSSEERLEYNKTVOLYNVVFSNPYBIKQNNNIYLTNTNNLNLOVSKF
1036 1056 1078
1095 KLLSINPNKYQVKLDEVIIISVLDMNEKVIDISDNRLQLIDNKNNAKXMIISNDIFISN
1123
1155 CLIIISYNGKYLCSMDKENHNWMCNNDMSKYLILWSFK
1186
-----
26 matches found in sequence:
q45887 ; Botulinum neurotoxin type F nontoxic-nonhemagglutinin component.
(from "bt.spt.pep")
TOIG of: q45887 check: 702 from: 1 to: 1165
ID Q45887 PRELIMINARY; PRT; 1165 AA.

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AC Q45887;
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type F nontoxic-nonhemagglutinin component.
DE NINH.
GN Clostridium botulinum.
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type F;
RA East A.K.;
RL Submitted (MAR-1993) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=type F;
RA East A.K.; Richardson P.T., Allaway D., Collins M.D., Roberts T.A.,
RA Thompson D.E.;
RT "Sequence of the gene encoding type F neurotoxin of Clostridium
RT botulinum.";
RL FEMS Microbiol. Lett. 96:225-230 (1992).
DR EMBL; X71086; CAA50404.1; -.
DR PIR; I40644; I40644.
DR GO; GO:0004866; F: endopeptidase inhibitor activity; IEA.
DR GO; GO:0008233; F: peptidase activity; IEA.
DR GO; GO:0015070; F: toxin activity; IEA.
DR GO; GO:0009405; P: pathogenesis; IEA.
DR GO; GO:0006508; P: proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_1ec_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOLILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00283; SOYBEAN_KUNITZ; 1.
KW Neurotoxin.
SQ
SEQUENCE 1165 AA; 136526 MW; 312AC293EEDFIC65 CRC64;

Q45887 Length: 1165 September 1, 2004 07:07 Type: P Check: 702 ..
Found using 'seq23' (hayes346.key)

...
128 SEYLYSANIVIFPGSNIVKNNIYKKNFAENGMTMAELFQPLFTVYKYNQFYADPAL
178
188 ELIKCLIKAIYFLYGIKPNNDNLNIPYRLNFPNSVEYSELNIDFLISGIDYKFINTP
224
248 YWFDNYFDVDPKVFKEKHKNDYEINKNNSEIGTSIKLYLEQKFTNVQDIWELNLSYFS
248
308 KEFQIMPEKHNALKHYYRKEYKINYSKYQYDINGFVNGQIATKLLSEKQYIINKFQ
330
368 LIINLINKNNLSLMSKNYVGDGLNGTTDNFNRNYKIPDNIAQYHPNNTYLDNVNIEEI
399
428 NNIPQITDADIYPTVNNCDTFPIYNIQTSREINTTVPYSINYLOSQIMNSDDITLSSDF
525
488 WEVVCNSDKSLVYSYLDNVINYLDSIKNNTPINTDKYILWLKEIFRNYSFDTATEIT
526

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548  TEGINKIVSWFGKAFNLTNTDSFKIEFQSGAIALINKKDNIIIPKIEIDEMPNSMLN
      |--| |--| |--| |--|
608  LSPEDINEQLYSISKNTYFKKIYNFLDQMTWTEYSQYFDLICMAKKSILAQENLIKK
      618 632 644 647
668  IIQKISYLIGASNIPDILAVMLRTTNTLRDISVESQIAMNNLNNFLNAKAMCVFQSN
      |--| |--| |--|
728  IYPKISFMEQCIKHINKSTKEFIQKCTNINETEKLQIMQNSPNSLDFDLIQNMKNL
      729
788  ENSYTELLIKEQTSPEYLSLYAFEEQDNVIGDASGKNTLVEYPKGIELVYGINNSALYL
      791
848  NGSNQSIIFTNDYFENGLTNSFSIYFWLRLNGDQTIKSLGSKYNCGWEIFYQEIQHV
      842
908  FNMIDSGNEKNIYLSDVSNNSWHYITISVDRLKEQLLIFIDNVLVNESIKDILNIYSS
      932
968  NIISLSDNKASVIEGLTILNKPTTGEVLRYNFKNLNSYVRDSNDERLEYNKTYQLYD
      1023 1026
1028  YVFPDNPICEVKQDNNIYITINNNLNMMKPKCKLLSINSNKQYVQKWDEVIISVLYDT
      1029
1088  EKYVCISNENNRVKIIDNKIMQVFIISNDIFISNCLTEAHNNKYICLSMKDENYNNWIC
      1090 1132 1142
1148  NNESNIPKAYLWILKEV
      1158
-----
27 matches found in sequence:
q45888 ; Nontoxic-hemagglutinin (NTNH protein).
(from "bt_spt.pep")
TOIG of: q45888 check: 8618 from: 1 to: 1197

ID Q45888 PRELIMINARY; PRT; 1197 AA.
AC Q45888;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-JAN-1998 (TREMELrel. 05, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Nontoxic-hemagglutinin (NTNH protein).
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae; Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NON-PROTEOLYTIC EKLUND B17 ATCC 25765;
RA Campbell K., Collins M., East A.K.;
RL Submitted (MAY-1997) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=NON-PROTEOLYTIC EKLUND B17 ATCC 25765;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RL Submitted (MAY-1997) to the EMBL/GenBank/DBJ databases.
```

```
[3]
RN RP SEQUENCE OF 1-23 FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
RT silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792(1996).
DR EMBL; X78229; CAA55073.1; --
DR EMBL; X87850; CAA61127.1; --
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; I.
DR PRINTS; PR00760; BONTOXILYSIN.
DR PRODOM; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1197 AA; 138959 MW; 20E5F4312A959192 CRC64;

Q45888 Length: 1197 September 1, 2004 07:07 Type: P Check: 8618
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFSQDSKDKFLQAITILLKRINSTNAGEKLLSLISTAIPPPYGYGGYYA
      |--|
      110
120 PNMITFGSAPKSNKLNLSLSTIPPPYAGYRETNLYLSSSDNKNFYASNIVIRPGSNIV
      |--|
      147
180 ENNTVYKKEADAENGMTETWQFPLTYKDYDPAIELMKCLIKSLFLYGIKPS
      |--|
      211
240 DDLVVPYRLRELENIYSQNLIVLLVSGGIDPKFINTDPYWFIDNYFSNAKKVFEDHR
      |--|
      257
300 NIYKTEVEGNAIGNDIKLRLKQKFRINTNDIWLNLNLYFSKEFSIMMPDRFNALKHY
      |--|
      363
360 RKQYKIDYPENYSINGFVNGQINAQFLSDRQDIINKPBEIINLLNGNVSIMRSNIY
      |--|
      431
420 GDGLKSTVDDFYSNYKIYPNRAVEYHFNNNSDSSLNVTGVIDNIPEIIDVNPYKEND
      |--|
      438
480 KPSVQKITSTREINTNPWPINYLQANTNNERFSLSSDFVEVSSKDKSLVYGLSNV
      |--|
      503
540 MFYLDISKNSPIDTDKEYYLWLREIFRNYSFDTATQTEINTNCINGKIVAVFGKALNIL
      |--|
      558
600 NTSDSFVEEFQNL
      |--|
      559
...
615 SSLINKKENLSMPIITEIDEPNYMGLPLNDLNEKLFNLYLKNILYFKKVFELDQWWT
      |--|
      665
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675 EYYSQFDLICMAKQSIQAQKLIQIIONKQLDLSKADISMDKLMNMLNATGKTIFDLS
677 680
735 NESQIAIDNINDFLNKAICFFDTNYPKFIKSPWQICINSVNSVNTTTFIQKCTNITEDEK
761
795 LQIKLNTFMNIDFEFFDIQIKXDLITSETDLIKEEKESDYNLFLTLQEDNNKNKVIDIS
835
855 GKNTLYKYSISLYVGVNGDALYLKEPNESVSF
914 IITSKLIENKADNCGWEIYFENNGLVFSIVDCNGNEENIYVSDVISKNNWYVVISIDRLR
964
974 NQLLIFINDKLIANQSTIEQILNIYSSSTISLVNENNPIYVEGLSILNRSTSEVVNNYF
1032
1034 SYLNNYSYRDISGRLEKLYEYNNIYVFPENSLEYVTENNNIYLSIKDNTDNLNIQAKF
1035 1051 1058 1077
1094 KLINIDNTKQYVQWDEGVCLLGDDEEKYVDISSENNFIQLVSSRDTAKKIFENNDFKP
1122
1154 NCLTFAYNNKYLISLFRDNNYNNMIIYNNNDNIPKAAHLWLTKGI
1164 1174

8 matches found in sequence:
q45890 ; P-47 protein (Unidentified ORF).
(from "bt spt pep")
TOIG of: q45890 check: 611 from: 1 to: 416
ID Q45890 PRELIMINARY; PRT; 416 AA.
AC Q45890;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-AUG-1999 (TREMBlrel. 11, Last sequence update)
DT 01-AUG-1999 (TREMBlrel. 11, Last annotation update)
DE P-47 protein (Unidentified ORF).
GN P-47.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the botulinum neurotoxin
complex in a strain of Clostridium botulinum producing type B and F
neurotoxins.";
RT Curr. Microbiol. 37:312-318 (1998).
RN [2]
RP SEQUENCE OF 335-416 FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
silent type B neurotoxin gene sequences.";
RT J. Biol. Chem. 271:10786-10792 (1996).

DR BMBL; Y13631; CAA73970.1; -.
DR BMBL; X87848; CAA61122.1; -.
SQ SEQUENCE 416 AA; 47570 MW; 56BCE238EDBDFAB9 CRC64;
Q45890 Length: 416 September 1, 2004 07:07 Type: P Check: 611 ..
Found using 'seq23' (hayes346.key)
...
21 LEEYITKNKVEFLYSNTAKQELIKMNFQSWELINGGTSNLFRIKILIKIKGYFKVRNTTID
71 74
81 LSGINPVLEIKLDFDNTSNPNVKLKFDFGSESSDNKIVIVSDLSGKLDEEQFYFNKL
141 LIDTFFONEKQVSYIFASLNVTSNIAMNPKQFKFVYVYPTNNSDGYLFIILSVVVTNRDIS
154 187
201 KLSTNVDGNILSNSEVGLLISEKLFFQNLALPKLTSMGSDISQKNFVSSKSDTTAGI
261 YNSSTLWYGIKVGLIWYYPKINSFVLNSYEGNKLNIKVSRVKLTGYEIVYADFSSISI
279 308 312
321 NKFMYSKKNKRAVEIDKNAKTKKIYRVDLIPAAIINSVVVYMSIKEALGFQLAN
333 364
381 NFTNIINDVNNNLKISEVTNVIENFVFCIQKAN

27 matches found in sequence:
q45891 ; NTNH protein.
(from "bt spt.pep")
TOIG of: q45891 check: 6133 from: 1 to: 1161
ID Q45891 PRELIMINARY; PRT; 1161 AA.
AC Q45891;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-NOV-1996 (TREMBlrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE NTNH protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
silent type B neurotoxin gene sequences.";
RT J. Biol. Chem. 271:10786-10792 (1996).
DR BMBL; X87848; CAA61123.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cona like lec gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; Pf01742; Peptidase_M27; I.
DR PRINTS; PR00760; BONTOXIIFIN.
DR ProDom; PD001963; Bontotoxysin; 1.
SQ SEQUENCE 1161 AA; 135354 MW; 04D9FD7980ADCFFB CRC64;
Q45891 Length: 1161 September 1, 2004 07:07 Type: P Check: 6133 ..
Found using 'seq23' (hayes346.key)

1	MOFVNQFNKDPVNGVDIAYIKIPNVGQMPQKAFKHKKIHWIPERDTFTNPEBGDLN	21 24	240	DOLVIPYRLRSELENIEYSQNLIVDLLVSGGDDPKFINTDPTWFDNYSNAKKVFEHR	257
61	PPPEAKQVPVSYVD		300	NIYETEIEGNAIGNDIKLRLLQKPRININDIWELMLNYFSKEFSIMPDPRFNALKHFY	
...			360	RKQYKIDYPENYSINGFVNGQINAOQLSDRNQDIINKPEEIIINLLNGNVSLMRSNIY	363
135	INVIPDGSYRSEELNLVIIGPSADIIQPECKSFGEHVLNLTNRNGYGSQYIRFSPDFTF	185	420	GDGLKSTVDDFYSNYKIPYNRAVEYEHFNNSDSSLNVNIGVIDNIPEIIDVNPYKENC	431 438
195	GFESLEVTNPLLGAGKFAFDPAVTLAHELHAGHRLYGLGAINPNRVKVNINAYEVS	233 250	480	KFSPVQKITSTREINTNIPWPINYLQAOQNTNEKFSLSDFVEVWSSKOKSLVYFSLNV	503 533
255	GLEVSF		540	MFYIDSIKDNPIDTDKKYLLMLREIFRNYSFDTATQETINTDCGINKVVTWFGKALNIL	558 559
-----			600	NTSDSFVEEFQNL	
28 matches found in sequence:			...		
q45893 ; NTN protein.			615	ISLINKENLMPKIEIDEIPNSMLNLSFKDLSNLFNIPSKNNSYFEKIYYDFDQWWT	665 666
(from "bt_spt.pep")			675	QYYSQYFDLICKAKRSVLAQBSLKKIQQKLSYLGNSNITSDMLMLNTTTNLTLDI	677 680
TOIG of: q45893 check: 614 from: 1 to: 1198			735	SNESQIMNVNFFLNVAICVFQINIVPKFISPMEQCINNINKNTRFIOKCTNITENE	762
AC Q45893 PRELIMINARY; PRT; 1198 AA.			795	KIQLINQNISSLODFELNIELKSLFNSGTGLLIKEETSPYELVLYAFQEPGNAIGA	836
DT 01-NOV-1996 (TREMBLrel. 01, Created)			855	SGKNTSIEYSKDIGLVYGINSDALYINGSNQSIQSFNDFFENGLTNSFSIYFWLRNLGKD	905
DT 01-NOV-1996 (TREMBLrel. 01, Last sequence update)			915	TTIKSLIGSKEDNCGWIEYFQDTGLVFNMDISNGNEKNYILSDVSNNSWHYITISVDRLK	965
DT 01-OCT-2003 (TREMBLrel. 25, Last annotation update)			975	EQLLIFIDDLNVANGSIKEILNIYSNTISLYNENNPIYVEGLSIILNRSITSEVVNNYF	1033
DE NTN protein.			1035	TYINNSYIRDISGERLEYNKTYELVNYVFPESLSYEVTENNNIYLSIKNTNINLIQAKF	1036 1056 1059
GN Clostridium botulinum.			1095	KLINIDANKQYQKWDGEGVVCLLGDEEKYVDLSSENRIQLVSSKDTAKRIIFNNDIFRP	1123
OS Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;			1155	NCLTFAYNNKYLSLSLRDRNRYNWMICNNNDNIPKAAHLWALKGI	1165 1175
OC Clostridium.					
OX NCBI_TaxID=1491;					
RN [1]					
RP SEQUENCE FROM N.A.					
RC STRAIN=667Ab;					
RX MEDLINE=96210012; PubMed=8631890;					
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,					
RA Sugiyama H.;					
RA "Genetic characterisation of Clostridium botulinum type A containing					
RT silent type B neurotoxin gene sequences.";					
RL J. Biol. Chem. 271:10786-10792(1996).					
DR EMBL; X87849; CAA61125.1; -.					
DR GO; GO:0008233; P:peptidase activity; IEA.					
DR GO; GO:0015070; F:toxin activity; IEA.					
DR GO; GO:0009405; P:pathogenesis; IEA.					
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.					
DR InterPro; IPR008985; ConA-like lec_gl.					
DR InterPro; IPR000395; Peptidase_M27.					
DR Pfam; PF01742; Peptidase M27; 1.					
DR PRINTS; PR00760; BONTOXILYSIN.					
DR ProDom; PD001963; Bontoxilysin; 1.					
SQ SEQUENCE 1198 AA; 138352 MW; 0D8C41BD61E32A7F CRC64;					
Q45893 Length: 1198 September 1, 2004 07:07 Type: P Check: 614 ..					
Found using 'seq23' (hayes346.key)					
...					
60	DGGIYDSNLSQDSEKDFLOAIITLLKRINSTNAGEKLLSLISTAIPFPYGGYGA	110	1035	TYINNSYIRDISGERLEYNKTYELVNYVFPESLSYEVTENNNIYLSIKNTNINLIQAKF	1036 1056 1059
120	PNMITGSAKSNKLNLSLSTIPFPYAGYRETNYLSSEDNKSIFYASNIVIFPGGANIV	147	1095	KLINIDANKQYQKWDGEGVVCLLGDEEKYVDLSSENRIQLVSSKDTAKRIIFNNDIFRP	1123
180	ENNTVFPKEDAENGMGMTWEINFPQPLTVKYDEFYIDPAIELIKLIKLSLYLYGIKPS	211 231	1155	NCLTFAYNNKYLSLSLRDRNRYNWMICNNNDNIPKAAHLWALKGI	1165 1175

27 matches found in sequence:

q45914 ; Type A progenitor toxin nontoxic-norHA (NTNH).
(from "bt_spt.pep")

TOIG of: q45914 check: 3736 from: 1 to: 1193

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ID Q45914 PRELIMINARY; PRT; 1193 AA.
AC Q45914
DT 01-NOV-1996 (TrEMBLrel. 01, Created)
DT 01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Type A progenitor toxin nontoxic-norHA (NTNH).
GN ANT OR NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=type A NIH;
RX MEDLINE=96096783; PubMed=8521962;
RA Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RL components of Clostridium botulinum type A progenitor toxins.";
FEBS Lett. 376:41-44(1995).
RN [2]
RP SEQUENCE OF 1-160 FROM N.A.
RC STRAIN=type A NIH;
RA Inoue K., Fujinaga Y., Watanabe T., Ohshima T., Takeshi K.,
RA Morishiki K., Oguma K.;
RT "Molecular composition of Clostridium botulinum type A progenitor
RL toxins.";
RN [3]
RP Submitted (SEP-1995) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
RL type A strains.";
RN [3]
RP Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; D67030; BAA11050.1; -.
DR EMBL; AF461540; AAM75960.1; -.
DR PIR; S68218; S68218.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1193 AA; 138092 MW; 9052E13B6E0F9848 CRC64;
Q45914 Length: 1193 September 1, 2004 07:07 Type: P Check: 3736
Found using 'seq23' (hayes346.key)

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60 DGGIYDSNFLSQDSKDFLOAIITLLKRINSTNAGEKLLSLISTAIPPPYGVGGYYA
110
120 PNMITFGSAPKKNKLNLSISSTIPFPYAGRETNVLSSEDNKSFYASNIVIFGPGANIV
147
180 ENNTVFYKKEDAENGMTETWTFQFLTYKYKDEYFIDPAELIKLKLSFLYGIKPS
211
240 DDLVITPRLRSELEIYSQLNIVDLVLSGGIDPKFINTDPYWFDTNYSNAKKYFEDHR

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300 NIYETEIEGNN
...
313 GNDIKLRLKQKFRININDIWELNINLYFSKFSIMMPDRFNNAKHFYRKQYKIDYPENY
363
373 SINGFVNGQINQAQLSLSDRNQDIINKPEEIIINLNGNNSLMRSNIYGDGLKSTVDDFYS
431
433 -| |---|
NYKIPYNRAVEYEHFNNSDSSLDNVNIGVIDNIPEIIDVNPYKENCDFSPVQKITSTRE
434 438
493 INTNIPWPINYLQAOQNTNNEKFSLSDFSVEVSSKDKSLVYSFSLSNVMFYLDSIKDNPIS
503
553 DTOKKYILWLREIFRNVSPDITATQETINTNCGINKVVTWFGKALNLTSDSFVEEFQNL
558
...
615 ISLINKKENLSMPFIESYEIPNDMLGPLNDLNEKLFNYSKNTAYFKKIYVNFLOQWWT
665
675 QYYSQYFDLICKMAKRSVLAQETLIKRIIOKKLSYLIGNSISSDNLALMLTTTTLRDI
677
680
735 SNESQIAMNVDSFLNNAACVFNESNIYFKFISFMEQCINNINIKTKFKQKCTNINEDE
762
795 KLQLINQNVFSLDPEFLNIQNMKSLFSSETALLIKEETWPELVLYAFKEPGNNVIGDA
836
855 SGKNTSIEYKSDIGLVGINSDALYINGSNQSIQSFNSDPFENGLTNSFSIYFWLRNLGKD
905
915 TTKSKLIGSKEDNCGWEIFYQDTGLVFNMDISNGNEKNIYLSDVSNNSWHYITISVDRLK
965
975 EQLLIFIDDLNVANESIKEILNIYSSNIISLSENNPSYIEGLTILNKPTTSQEVLSNYF
1033
1035 -| |---|
EVLNNSYIRDSNEERLEYNTKYQLYNYVFSKPICEVKQNNNIYLTINNTNMLNQASKF
1036
1056
1059
1095 KLLSINPNKQYVQKLDEVIISVLNDNMEKYIDI SEDNRLQLIDNKNNAKMIISNDIFIS
1123

```

```
1155 CLTLYNGKVICLSMKDENHNWMLCNNDMSKYLXLWSFK
1164
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24 matches found in sequence:
q45916 : 138kDa protein associated with BoNT /C1-haemagglutinin complex.
(from "bt_spt.pep")
TOIG of: q45916 check: 1897 from: 1 to: 1196

ID Q45916 PRELIMINARY; PRT; 1196 AA.
AC Q45916;
DT 01-NOV-1996 (TREMBlrel. 01, Created)
DT 01-MAY-1999 (TREMBlrel. 10, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE 138kDa protein associated with BoNT /C1-haemagglutinin complex.
GN CHN-138.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RA Hauser D.F., Eklund M.W., Popoff M.R.;
RL Submitted (MAY-1992) to the EMBL/GenBank/DBJ databases.
DR EMBL; X66433; CAA47059.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOLILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1196 AA; 138726 MW; 88D5956301FA4A91 CRC64;

Q45916 Length: 1196 September 1, 2004 07:07 Type: P Check: 1897
Found using 'seq23' (hayes346.key)

...
60 DGGIYDSNFLSQDSERENFLQAIILKRNNTISGKQLLSLSTAIAPPFYIGGGYSS
110
120 PNIPTFGKTPSKNKLNSLVSTIPFPFGGVRNTYIESQNNKNFYASNVIIFGPGSNIV
180 ENNVYYKKNDANGMTMAETVFPQLLTYYKNKPYIDPAMELTCLKLIKSLYFLYGIKPS
211
240 DNLVVPYRLRTELNDKQPSQLNIIDLLISGGVDLEFINTNPYFTNSYFPNSIKMFERYK
298
-|
300 NIYKTEEGNNAIGNDIKRLKQKQFQINVQDINWNLNLYFCQSFNSIIPDRFSNALKHFY
301
360 RKQYVTMDYTDNYNGFVNGQINTKLPLSNKNTNIIISKPEKVVNLVNENNISLMSKNYI
363
420 GDGLKGTTFDYSTYKIPYNEEYEFVNDSDNFPNLSIEEDVSIPELIDINPYKNSD
431
480 NLVFTQITSMTEVTHTALSINYLQAQITNNENFTLSSDFSKVSSKDKSLVYSFLDNL
503
|---|
503
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DR EMBL: D38442; BAA07477.1; -.
DR HSSP: P10845; 2BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like Lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin.
SQ SEQUENCE 1285 AA; 147365 MW; EED98E4EAC6413 CRC64;
Q45967 Length: 1285 September 1, 2004 07:07 Type: P Check: 8797
Found using 'seq23' (hayes346.key)

1 MTWPKVDFNYSDFVNDNDILYLRIPQNKLTTPVKAFMITQNLWIPERFSSDTNPISLK
21 24
61 PPRPTSKYSQSYDPSYLSSTDEQKDTFLKGIKLFKRIKINERDICKKLINLVGVGSPFMGDS
68 71
121 STPEDTFDTRHTTNTIAVEKFENGSMKYNITLTPSVLIFGL
109
...
247 KRIRPOVSEGTQDGNVQFELYTFGSDVEIIPQIERLQREKALGHYKDIKRLNN
297
307 INKTIPSSWSSNIDKYKIFSEKYNFDKNTGNFLVNDKFNLSYSDLTVMSEVIYSSQ
322
367 YNVKRTHYFSKHYLPVFNILDDNTIYTINGNLTGKFNISGQNIERNPALQKLS
380 393
427 ESVVDLFTKVCLRLTRNSRD
...
480 ETNVENYSDNFSILDESILDAKVPTNPEAVDPLLPNVNMEPLNVPGVEEVFYDDITKDVY
530
540 LMSYYLEAQKLSNNVENITLTSVEALGYSNKIYTFPLPSLAEKYNKGVQAGLFLNWN
543 575
600 EVVEDFTTNMKDITLDKLSVSAIIPYIGPALNIGNSALRGNFQAFATAGVAFLEGF
545
660 PEFTPALGVFTFYTSIQBREKIITKIENCLEQRVKRWKDSYQWVMVSNWLSRITTFQNH
673 701
720 SYQWYDLSYQADAIKAKIDLEYKKYSGSDKENIKSQVENLKNLSLDVKISEAMNINKFI
721 742
724
```

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780 RECSVTVLFXKMLPKV
...
877 NTLMDTSGYNAEVRVEGNVQINPIFPDFKLGSSGDDRGKIIVTQENINIVNAMESFSI
927 931
937 SPWIRINKVSNLPQGTIIDSVKNSGWSIGIISNLFVFTLKQENSEQDINFSYDISKN
952
997 AAGYNKWFVTITTNMGMNMIYINGKIDTIKVKELTGINFSKTITTFQNNKIPNTGLIT
1000
1057 SDSDNINMIRDFYIFAKELDDKDINILFNSLOYTNVVKDYWGNDLRYDKKEYTMINVNYM
1070 1090
1117 NRYMSKKGNGIVENTKNNNDNEGKIIKIRIGTNTDTRVRGENVLVYNTTIDNKQYS
1142
1177 LGMKPSRNLGTLDPVLGALDQPMDEIRKYGSFIIQPCNTFDYYASQLFLSSNATTNRLG
1206
1237 ILSIGSYFKLGDDYWFNHEYLPVIKIBHYASLLESTSTHWFVFPASE
1267
-----
24 matches found in sequence:
q53550 ; Progenitor toxin L nontoxic-nonhemagglutinin component.
(from "bt_spt.pep")
TOIG of: q53550 check: 1586 from: 1 to: 1196

ID Q53550 PRELIMINARY; PRT; 1196 AA.
AC Q53550;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Progenitor toxin L nontoxic-nonhemagglutinin component.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=96025415; PubMed=8569530;
RA Ohyanaga T., Watanabe T., Fujinaga Y., Inoue K., Sunagawa H., Fujii N.,
RA Inoue K., Oguma K.;
RT "Characterization of nontoxic-nonhemagglutinin component of the two
RT types of progenitor toxin (M and L) produced by Clostridium botulinum
RT type D CB-16."
RL Microbiol. Immunol. 39:457-465 (1995).
DR EMBL; S80809; AAB36016.2; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like Lec_gl.
DR InterPro; IPR00395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1196 AA; 138718 MW; 6D2DBB5F6AF38324 CRC64;
Q53550 Length: 1196 September 1, 2004 07:07 Type: P Check: 1586
Found using 'seq23' (hayes346.key)
```

1058

```
...
60  DGGYDSNFLSQDSERENFLQAIILLKRINNITSGKQLLSLSTAIPTFPFYGGYGGYSS
    110
120  PNIFTFGKTPKSNKLNLSVTSTTPPPFGGYRETNYIESQNNKNFYASNIVIFQPGSNIV
    211
180  ENNVIIYKKDAENGMTMAEIVEFQPLLTYYKYNKPYIDPAMELTCKLISLYFLYGIKPS
    231
240  DNLVVPYELRTELNDKQFSQLNIIDLLISGGVDLEFINTNPWFNTSNFYFNSIKWFEKYK
    298
300  -|
    NIYKTEIEGNAIGNDIKRLKQKQFQINQVDIWNILNLYFCQSFNSIIPDRFSNALKHFY
    301
360  -|
    RKQYTMWYDNTNNGFVNGQINTKPLPSNKNWNIISKPEKVNVLNENNISLMKSNII
    363
420  GDGLKGTTEDFYSTYKIPYNEEYERFNSDNFPLNNISIEEVDISIPEIIDIINPYKDNSD
    431
480  NLVPTQITSMTEEVTTHTALSINYLQAIQTNNENFTLLSDFSQVSSKDKSLVYSFLDNL
    503
540  MSYLETIKNDGPIDTDKKYILWLKXEVFNKYSFDINLTQEIDSMCGINEVLWFGKALNIL
    558
    559
600  NTSNSFVEEYQDSGAIISLSKKNLREPNIEIDDISDLSGLSKFDLNNKLYEYISKNIIV
    651
660  YFKKIYFSLQWMTWYYSQYFELICMAKQSLAQESLVKQIVQNKFTDLSKASIPPTL
    665
    677
    680
720  XLIRRETEKTFIDLSNESQISMNRYDNFLNKASICVFVEDIYPKFISYMEKYVINNIKT
    761
780  REFIQRCNTININDNEKSLINSYFTKIDFKFLDIQSIKNFPNSQVEQVMKEILSPYQLL
    835
840  FASKGPNSEIISGKNTFIQYTESIELVYGNGESLYLKSNETIKF
...
914  DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQESVYLSNIINDNNWYISISVDRLK
    964
974  DQLLIFINDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLNPITSEVIRNYF
    1032
1034 -|
    SYLDNSYTRDSKSLLEYKNKNYQLINYPFETPSLYEVNDNNKNSLYSLTQDGINISSVKF
    1035
    1055
    1077
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1094  KLINIDESKGVQKWDCEIICVLDTGTEKPENNRIQLVSSKDNNAKKTIVNTDLFRP
    1122
1154  DCITFSYNDKYFSLSLRDGDYNNMICNDNNKVPKGAHLWILES
    1164
    1174
-----
7 matches found in sequence:
q57176 ; Hypothetical protein (Botr) .
(from "bt_spt.pep")
TOIG of: q57176 check: 3129 from: 1 to: 178

ID   Q57176  PRELIMINARY;      PRT;   178 AA.
AC   Q57176,
DT   01-NOV-1996 (TrEMBLrel. 01, Created)
DT   01-NOV-1996 (TrEMBLrel. 01, Last sequence update)
DT   01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE   Hypothetical protein (Botr) .
GN   P-21 OR BOTR
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC   Clostridium.
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=NTC 7272;
RA   East A.K.; Stacey J.M., Collins M.D.;
RL   Syst. Appl. Microbiol. 17:306-312(1994).
RN   [2]
RP   SEQUENCE FROM N.A.
RX   MEDLINE=96096783; PubMed=8521962;
RA   Fujita R., Fujinaga Y., Inoue K., Nakajima H., Kumon H., Oguma K.;
RT   "Molecular characterization of two forms of nontoxic-nonhemagglutinin
RL   components of Clostridium botulinum type A progenitor toxins.";
RL   FEBS Lett. 376:41-44(1995).
RN   [3]
RP   SEQUENCE FROM N.A.
RA   Inoue K., Fujinaga Y., Watanabe T., Ohyama T., Takeshi K.,
RA   Moriishi K., Oguma K.;
RL   Submitted (DEC-1995) to the EMBL/GenBank/DBJ databases.
RN   [4]
RP   SEQUENCE FROM N.A.
RC   STRAIN=62A, and Hall A-hyper;
RA   Dineen S.S., Bradshaw M., Johnson E.A.;
RT   "Comparison of the neurotoxin gene clusters in Clostridium botulinum
RL   type A strains.";
RL   Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR   EMBL; X79104; CAA55717.1; -.
DR   EMBL; D67030; BAA11049.1; -.
DR   EMBL; AF461538; AA075952.1; -.
DR   EMBL; AF461540; AA075959.1; -.
DR   PIR; S68219; S68219.
DR   InterPro; IPR009043; RNA_pol_sigma.
KW   Hypothetical protein.
SQ   SEQUENCE 178 AA; 21733 MW; 36E00BBDC3F08E69 CRC64;

Q57176 Length: 178 September 1, 2004 07:07 Type: P Check: 3129
Found using 'seq23' (hayes346.key)
```

```
1  MNKLFLOIKMLKNDNREFQEIFKHFKEKTINFTRKYNIDYNDILYHLWYTLKKVDLSN
    36 39 42 45 50
    39 42
61  FNTQNDLERYISRTLKRYCLDICNKRKIDKKIYNSEIVDKKLSLIANSYSYSLFEFEND
    110
```

113

121 LISILPDDQKKIYWKRFVEDIKRDKIAKLNISQSVYKYNKIMALERLEPILKKLINM
134

6 matches found in sequence:

q57230 ; HA-33 protein.
(from "bt_spt.pep")
TOIG of: q57230 check: 3622 from: 1 to: 293

ID Q57230 PRELIMINARY; PRT; 293 AA.
AC Q57230;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33 OR HA34.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=667AB;
RX MEDLINE=96210012; PubMed=8631890;
RA Hutson R.A., Zhou Y., Collins M.D., Johnson E.A., Hatheway C.L.,
RA Sugiyama H.;
RT "Genetic characterization of Clostridium botulinum type A containing
RT silent type B neurotoxin gene sequences.";
RL J. Biol. Chem. 271:10786-10792 (1996).
RN [2]
RP SEQUENCE FROM N.A.
RA Henderson I., Whelan S.M., Davis T.O., Minton N.P.;
RL Submitted (JUN-1995) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE OF 1-279 FROM N.A.
RC STRAIN=NCTC 2916;
RX MEDLINE=98173581; PubMed=9504990;
RA Rodriguez Jovita M., Collins M.D., East A.K.;
RT "Gene organization and sequence determination of the two botulinum
RT neurotoxin gene clusters in Clostridium botulinum type A(B) strain NCTC
RT 2916.";
RL Curr. Microbiol. 36:226-231 (1998).
RN [4]
RP SEQUENCE OF 1-279 FROM N.A.
RC STRAIN=NCTC 2916;
RA Rodriguez Jovita M.;
RL Submitted (JUL-1997) to the EMBL/GenBank/DBJ databases.
DR EMBL; X87850; CAA61129.1; -;
DR EMBL; I42537; AAB42189.1; -;
DR EMBL; Y14239; CAA74632.1; -;
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin_B lectin.
DR Pfam; PF00652; Ricin_B lectin; 5.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS50231; RICIN_B LECTIN; 2.
SQ SEQUENCE 293 AA; 34035 MW; D8A9B1AEFEBC808B CRC64;

Q57230 Length: 293 September 1, 2004 07:07 Type: P Check: 3622 ..
Found using 'seq23' (hayes346.key)

1 MEHYSVIONSLNDKIVTISKADTNLFYQVAGNVSILFQQTNRNLERWRLIYDSNKAAYK
4 7
29 32

61 IKSMIDHNTNLVLTWNPAPHTNSTQDSNADNQYLLLLKDKIGNNSFIASYKNPVLVLA
94 97

121 DIVARNKLSTLNNSYNKFIEDYIISDLNFTCKISPLDRKVVQVDMTNLVNLY

137

181 TWDYGRNQKWTIRYNEEKAAQYOFNTILSGVLTWFSNGTVRVSSNDQNNDAYWLI
201

241 NPVSDTDETYTITNLRLDTTKALDLYNSQTANGTAIQVFNHGHGDDNQKWN

29 matches found in sequence:

q57236 ; Botulinum neurotoxin type F (BONT/F protein).
(from "bt_spt.pep")
TOIG of: q57236 check: 3506 from: 1 to: 1278

ID Q57236 PRELIMINARY; PRT; 1278 AA.
AC Q57236; Q45863;
DT 01-NOV-1996 (TREMELrel. 01, Created)
DT 01-NOV-1996 (TREMELrel. 01, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type F (BONT/F protein).
GN BONT/F.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 10281;
RA Hutson R.A., Collins M.D.;
RL Submitted (AUG-1995) to the EMBL/GenBank/DBJ databases.
RN [2]
RP SEQUENCE FROM N.A.
RA Elmore M.J., Bodsworth N.J., Whelan S.M., Minton N.P.;
RL Submitted (AUG-1994) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE OF 635-1000 FROM N.A.
RC STRAIN=NCTC 1028;
RX MEDLINE=94013372; PubMed=8408542;
RA Cambell K., East A.K., Collins M.D.;
RT "Gene probes for identification of the botulin neurotoxin gene and
RT specific identification of neurotoxin types B, E, and F.";
RL J. Clin. Microbiol. 31:2255-2262 (1993).
RN [4]
RP SEQUENCE OF 1-27 FROM N.A.
RC STRAIN=LANGELEND;
RX MEDLINE=98404102; PubMed=9732534;
RA East A.K., Bhandari M., Hiem S., Collins M.D.;
RT "Analysis of the botulinum neurotoxin type F gene clusters in
RT proteolytic and nonproteolytic Clostridium botulinum and Clostridium
RT barati.";
RL Curr. Microbiol. 37:262-268 (1998).
DR EMBL; X81714; CAA57358.1; -;
DR EMBL; I35496; AAB23210.1; -;
DR EMBL; X70821; CAA50152.1; -;
DR EMBL; X99064; CAA67512.1; -;
DR PIR; S48110; S48110.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -;
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lectin.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept_M_zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.

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DR PROSITE; PS00142; ZINC_PROTEASE; 1.
KW Neurotoxin.
SQ SEQUENCE 1278 AA; 147073 MW; A1BE1318431D6918 CRC64;
Q57236 Length: 1278 September 1, 2004 07:07 Type: P Check: 3506
Found using 'seq23' (hayes346.key)

1 MPVVINSFNVPNDVTILYMQIPYEKSKYYKAFKPEIMRWNIIPERNITGTDPSDFD
  33 36
  21 24
  34 37
61 PPASLENGSSAYDPENLYTTDAEKDRY
...
237 YGARGVYKETIKVKQAPLMAEKPIRLEELFTFGQDLNIITSAMKEKIYNLLANYEK
  287 294
  297 IATKLSRVNSAPPEYDINEYKDYFQWKYGLDKNADGYTVNENKFNBIYKLYSFTBIDL
  316 345
  319
357 ANKPKVKCRNTFYFKYGLKVPNLDDDDIYTVSEGFNIGNLAVNNGQNIKLNPKIIDSI
  372
417 PDKGLVEKI
...
491 ILDYNSETIPQISQNTLNLVQDDSYVPRYDSNGTSEIEHNVDVLNVFFYLHAQKVPPEG
  541
551 ETNLSLTSSIDTALSRSQVTFSSSEFINTINKPVHAALFISINQVIRFTTEATQKS
  571
611 TFDKIADISLVVPVYGLNALNIGNEVQKENPKFAPELLGAGILLEFVPELLIPTILVFTIK
  624
671 SFTGSSENKKKIIRKAINNSLMERETKWKKEIYSWIVSNWLTRINTQPNKRKQMYQALQNG
  701 724
731 VDAIKTVIEYKYNNTSDERNRLESEYNNINIRELNKKVSLAMENIERFITESSIFYLM
  742
791 KLINE
...
813 LDYTSERHSILGNSVQELNDLVSTLNNISIPFELSSYTNDKILILYNKLYKKIKDNSIL
  863
873 DMRYENKFDISGYSNISGVYIYSTNRNQFGIYSSKPSVNAQNNDIILYNGRYQ
  931
933 NFSISFWVRIPKYNKVNLANNEYTIIDCIRNNNSGWKISLNNYKIIWTLQDTAGNQKLV
  934 955
993 PNYTQMISIDYINKWIPVTITNNRLGNSRIYINGNLIDEKISNLGDIHVSDNILFKIV
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995
1053 GCNDTRVGVGRYFKVFTDELGTETLYSDEPDPSILKDFWGNLYLLNKRYILLNLLRT
  1059 1064
  1097 1104
1113 DKSITQNSFLNINQQRGVYQKPNIFSNTRYTGVEVIRKNGSTDISNTDNFVRKNDLA
  1144
1173 YINVVDREVEYRLYADISIAKPEKIIKLIRTSNNSNLGQIIVMDSIGNNCTMNFQNNNG
  1173 1183
  1186
1233 GNIGLLGFHSNNLVASSWYNNIRKXNTSSNGCFWSFISKEHGMOEN
  1252

-----
3 matches found in sequence:
q7wrp2 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q7wrp2 check: 7931 from: 1 to: 71

ID Q7WRP2 PRELIMINARY; PRT; 71 AA.
AC Q7WRP2;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=109, and LCL155;
RA Franchosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
RA Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327860; AAQ16541.1; -.
DR EMBL; AY327861; AAQ16542.1; -.
KW Neurotoxin.
FT NON TER 1 1
FT NON TER 71 71
SQ SEQUENCE 71 AA; 8360 MW; BDC3E11757EF6122 CRC64;

Q7WRP2 Length: 71 September 1, 2004 07:07 Type: P Check: 7931
Found using 'seq23' (hayes346.key)

1 YLYDKEYLYLNLVLPNNFINRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTN
  1 4 8 11
  44 47
61 DNLVRNDDRVL

-----
4 matches found in sequence:
q7wrv0 ; Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")
TOIG of: q7wrv0 check: 6112 from: 1 to: 78

ID Q7WRV0 PRELIMINARY; PRT; 78 AA.
AC Q7WRV0;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
```


GN BONT/B.
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=215, and 216;
 RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
 RA Aureli P.;
 RT "Identification of botulinum neurotoxin gene types and of
 RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
 RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
 DR EMBL; AY327856; AAQ16537.1; --
 DR EMBL; AY327857; AAQ16538.1; --
 KW Neurotoxin.
 FT NON_TER 1
 FT NON_TER 78 78
 SQ SEQUENCE 78 AA; 9370 MW; 7CF465A3A32CBDBC CRC64;
 Q7WRX0 Length: 78 September 1, 2004 07:07 Type: P Check: 6112
 Found using 'seq23' (hayes346.key)

1 PLMYNKYMFNAGNKNYSIKLKXDSVSGEILTRSKYNQNSNYINRYLYIGEKFIIRK
 8 11 19 22
 43 46
 46 49
 61 SNSQSINDIVRNDRVF

3 matches found in sequence:
 q7ws40 ; Botulinum neurotoxin type A (Fragment).
 (from "bt_spt.pep")
 TOIG of: q7ws40 check: 6242 from: 1 to: 77

ID Q7WS40 PRELIMINARY; PRT; 77 AA.
 AC Q7WS40;
 DT 01-OCT-2003 (TREMELrel. 25, Created)
 DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
 DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
 DE Botulinum neurotoxin type A (Fragment).
 GN BONT/A.
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=42N, 13, and 137;
 RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
 RA Aureli P.;
 RT "Identification of botulinum neurotoxin gene types and of
 RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
 RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
 DR EMBL; AY327850; AAQ16531.1; --
 DR EMBL; AY327851; AAQ16532.1; --
 DR EMBL; AY327853; AAQ16534.1; --
 KW Neurotoxin.
 FT NON_TER 1
 FT NON_TER 77 77
 SQ SEQUENCE 77 AA; 8863 MW; 4253A787F62EBD32 CRC64;
 Q7WS40 Length: 77 September 1, 2004 07:07 Type: P Check: 6242
 Found using 'seq23' (hayes346.key)

1 KGRDISYMLNLFDPNKKVDVNNIGIRGYMLKGRGVSVTNINLYNLTVEGTRKFIK
 8 11 19 22 30 33
 61 KYASGNEIDIVRNDRVF

3 matches found in sequence:
 q7wuh7 ; Botulinum neurotoxin type E (Fragment).
 (from "bt_spt.pep")
 TOIG of: q7wuh7 check: 7993 from: 1 to: 71

ID Q7WUH7 PRELIMINARY; PRT; 71 AA.
 AC Q7WUH7;
 DT 01-OCT-2003 (TREMELrel. 25, Created)
 DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
 DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
 DE Botulinum neurotoxin type E (Fragment).
 GN BONT/E.
 OS Clostridium butyricum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1492;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=21;
 RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
 RA Aureli P.;
 RT "Identification of botulinum neurotoxin gene types and of
 RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
 RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
 DR EMBL; AY327859; AAQ16540.1; --
 KW Neurotoxin.
 FT NON_TER 1
 FT NON_TER 71 71
 SQ SEQUENCE 71 AA; 8391 MW; A1B3F4F757EP6122 CRC64;
 Q7WUH7 Length: 71 September 1, 2004 07:07 Type: P Check: 7993
 Found using 'seq23' (hayes346.key)

1 YLLYDKYVLLANVLKPNFNRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTN
 1 4 8 11
 44 47
 61 DNLVRNDHVV

2 matches found in sequence:
 q7wuh8 ; Botulinum neurotoxin type E (Fragment).
 (from "bt_spt.pep")
 TOIG of: q7wuh8 check: 9448 from: 1 to: 73

ID Q7WUH8 PRELIMINARY; PRT; 73 AA.
 AC Q7WUH8;
 DT 01-OCT-2003 (TREMELrel. 25, Created)
 DT 01-OCT-2003 (TREMELrel. 25, Last sequence update)
 DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
 DE Botulinum neurotoxin type E (Fragment).
 GN BONT/E.
 OS Clostridium botulinum.
 OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
 OC Clostridium.
 OX NCBI_TaxID=1491;
 RN [1]
 RP SEQUENCE FROM N.A.
 RC STRAIN=37;
 RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
 RA Aureli P.;
 RT "Identification of botulinum neurotoxin gene types and of
 RT neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
 RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
 DR EMBL; AY327858; AAQ16539.1; --
 KW Neurotoxin.
 FT NON_TER 1
 FT NON_TER 73 73
 SQ SEQUENCE 73 AA; 8641 MW; 163F8D5321495851 CRC64;
 Q7WUH8 Length: 73 September 1, 2004 07:07 Type: P Check: 9448
 Found using 'seq23' (hayes346.key)

```

1  YLLYDKELYLLVLPNNFIDGRKDSILRINNIRRTILLANRLYRGKVKQIKVRSPTSPT
  1 4
  44 47
  ---|
  |---|

```

61 DNCVRESERSICIS

```

4 matches found in sequence:
q7wu10 ; Botulinum neurotoxin type B (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu10 check: 6511 from: 1 to: 78

```

```

ID Q7WU10 PRELIMINARY; PRT; 78 AA.
AC Q7WU10;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CL196;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327855; AAQ16536.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 78 78
SQ SEQUENCE 78 AA; 9386 MW; 6E6465A3A32CBDBC CRC64;

Q7WU10 Length: 78 September 1, 2004 07:07 Type: P Check: 6511
Found using 'seq23' (hayes346.key)

```

```

1  PLMYNKEYYMFNAGNKNSYIKLKKDSSVGEILTRSKYNQNSNYINRYLXIGKFIIRK
  8 11 19 22
  43 46
  45 49
  ---|
  |---|

```

61 SNSQSINDDIVRNDRVY

```

2 matches found in sequence:
q7wu10 ; Botulinum neurotoxin type A (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu10 check: 6189 from: 1 to: 77

```

```

ID Q7WU10 PRELIMINARY; PRT; 77 AA.
AC Q7WU10;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CL138;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";

```

```

RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327854; AAQ16535.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8775 MW; 4C24DB812BFB53D2 CRC64;

```

```

Q7WU10 Length: 77 September 1, 2004 07:07 Type: P Check: 6189
Found using 'seq23' (hayes346.key)

```

```

1  KGRSCISSYMLNLFDPNKYYDVNNIGIRGYMYLKGRGSVVTTNIYLNSTLYEGTKFIK
  19 22 30 33
  ---|
  |---|

```

61 KYASGNEDNIVRNDRV

```

2 matches found in sequence:
q7wu11 ; Botulinum neurotoxin type A (Fragment).
  (from "bt_spt.pep")
TOIG of: q7wu11 check: 6135 from: 1 to: 77

```

```

ID Q7WU11 PRELIMINARY; PRT; 77 AA.
AC Q7WU11;
DT 01-OCT-2003 (TrEMBLrel. 25, Created)
DT 01-OCT-2003 (TrEMBLrel. 25, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type A (Fragment).
GN BONT/A.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=129;
RA Franciosa G., Pourshaban M., De Luca A., Buccino A., Dallapiccola B.,
  Aureli P.;
RT "Identification of botulinum neurotoxin gene types and of
  neurotoxicogenic clostridia by denaturing HPLC (DHPLC).";
RL Submitted (JUN-2003) to the EMBL/GenBank/DBJ databases.
DR EMBL; AY327852; AAQ16533.1; -.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 77 77
SQ SEQUENCE 77 AA; 8699 MW; C686DB812515B3DC CRC64;

Q7WU11 Length: 77 September 1, 2004 07:07 Type: P Check: 6135
Found using 'seq23' (hayes346.key)

```

```

1  KGRSCISSYMLNLFDPNKYYDVNNIGIRGYMYLKGRGSVVTTNIYLNSTLYEGTKFIK
  19 22 30 33
  ---|
  |---|

```

61 KYASGNEDNIVRNDRV

```

8 matches found in sequence:
q840g4 ; Toxin (Fragment).
  (from "bt_spt.pep")
TOIG of: q840g4 check: 4522 from: 1 to: 347

```

```

ID Q840G4 PRELIMINARY; PRT; 347 AA.
AC Q840G4;
DT 01-JUN-2003 (TrEMBLrel. 24, Created)
DT 01-JUN-2003 (TrEMBLrel. 24, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Toxin (Fragment).
GN Clostridium botulinum.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium
OX NCBI_TaxID=1491;
RN [1]

```



```
938  SFWIKSKOLTNHNEYTIINSIKQSGWKLCTRNQNIWILQDINRKYSKSLFDYSES 954  |---| |---| 986
1058  MLWIRDFNIFSKELSNEDINIVYEGQILRNVIKDYMGNPLKFDTEFYIINDNYIDRYIAP 1103  |---|
1118  KSNILVLVQVDRSKLYTGNPITIKSVDSKPNYSRIILNGDNIHFMILYNSGKXWIRDTD 1170  |---|
1178  TIYAIEGRECSKNCVYALKSQSNLGNVIGIGIFSINKIVSQNKYCSQIFSSFMKNTMLLAD
1238  IYKWRPSPFNATPVAVTNYETKLLSTSSFWKFIISDRDPGWVE 1250  |---|
1239  |---| |---| 1250

-----
9 matches found in sequence:
q84gj4 ; Neurotoxin type A light chain (Fragment).
(from "bt_spt.pep")
TOIG of: q84gj4 check: 3085 from: 1 to: 448

ID Q84GJ4 PRELIMINARY; PRT; 448 AA.
AC Q84GJ4;
DT 01-JUN-2003 (TrEMBLrel. 24, Created)
DT 01-JUN-2003 (TrEMBLrel. 24, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type A light chain (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Kungo;
RA Seong H.Y., Kim J.S., Lee M.H., Choi Y.M., Choi S.-Y.;
RT "Effects of minor arginyl and isoleucyl tRNA on the expression of
RT botulinum toxin light chain in Escherichia coli.";
RL Submitted (OCT-2002) to the EMBL/GenBank/DBJ databases.
RL EMBL; AY166872; AAC21363.1; -
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; F:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR00395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
FT NON TER 448 448
SQ SEQUENCE 448 AA; 51325 MW; 89C98BD162AC9FDBE CRC64;

Q84GJ4 Length: 448 September 1, 2004 07:07 Type: P Check: 3085
Found using 'seq23' (hayes346.key)

1 MPFVYKQFNKYKDPVNGVDIAIKIPINAGQMQVKAFKIHNKIWIPIERDTFTNPEEGDINP
21 24
61 PPEAKQVPVSYDS
...

134 INVIPDGSYSRSEELNLVIGPSADIIQFECKSGHEVLNLTRNGYSGTQYIRFSPDFTF 184  |---| |---|
194 GFESLEVDTNPLLGAGKATDPVTLAHLIHAHRLYGIAINPNRVFKVNTNAYTEMS 232  |---| |---| 249
254 GLEVSPEELRTFGCHDAKFIDSLQENEFRLYYNKFQDIASLTNLKAKSIYGTTSASLYMK 286  |---|
314 NVFKEKYLLEDSTSGKFSVDKLFKFKYMKTELYTEDDNFVKFFKVLNKRKTLNFDKAV 366  |---|
374 FKINIVPKVNYTIYDGFENLRNTNLAANFNQNTTEINNMFTKLKNTGLFEFYKLLCVRG 426  |---|
434 IITSKTSKSLDEGYNK 387  |---| |---|

-----
26 matches found in sequence:
q8gr96 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q8gr96 check: 9264 from: 1 to: 1291

ID Q8GR96 PRELIMINARY; PRT; 1291 AA.
AC Q8GR96;
DT 01-MAR-2003 (TrEMBLrel. 23, Created)
DT 01-MAR-2003 (TrEMBLrel. 23, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
GN BONTB.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RA Ihara H., Kohda T., Morimoto F., Tsukamoto K., Karasawa T.,
RA Nakamura S., Mukamoto M., Kozaki S.;
RT "Clostridium botulinum type B neurotoxin associated with infant
RT botulism.";
RL Submitted (APR-2002) to the EMBL/GenBank/DBJ databases.
RL EMBL; AB084152; BAC22064.1; -
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_1ec.g1.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1291 AA; 150574 MW; 0227CAEF4F58504D CRC64;

Q8GR96 Length: 1291 September 1, 2004 07:07 Type: P Check: 9264
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIIMWEPFARGTGRYKAFKITDRIWIIPRYTFGYKPEDFN
33 36
34 37
```

```
61 KSSGIFNRDVCYYDPDLNTNDKKNI
...
149 ERKKGIFANLIIFPGPVLNENETIDIGIQNHFAFREGFGGIMQMFKFCPEYVSVFNNVQE
199
209 NKGASIFNRGYSFDPALILMHLELIHVLHGLYGIKVDDLPDIVPNEKKFFMQSDTAQABE
269 LYTFGQDPSIITPSTDKSYLDKVLQFRGIVDRLNKVLVCISDPNININIKYKPKDKY
289
329 --| KVEDESGKYSIDVESFDKLYKSLMFGFTTETNAENYKIKTRASYFSDSLPPVVKIKNLLD
331
389 NEIYTTIEGFNISDKNWEKRYRQNKAINKQAYEEISKEHLAVYKIQMCKSVRAPGICID
421
449 VDNEDLFFIADKNSFSDLSKNERIE
...
520 VYEKQPAIKKIFTDENTIFQYLYSOTFPLDIRISLTSSFDALLFSNKVYFFSMDYIK
570
580 TANKVVEAGLFAGWVKQIVDDFVIEANKSSTWDKIADISLIVPYIGIALNVGNETAAGNF
623
640 ENAFEIAGASILLEFTPELLIPVVGAFLESYIDNKNKIKTIDNALTKRDKWIDMYGL
697
700 IYAQMLSTVNTQFYTIKEGMYKALNYQAQALEEIIKKYKNIYSEKEKSININIDFNDINSK
720
760 LNEGINQAVDNIINNFINESCVSLMKMKIPLA
...
838 FDLSMYTNNTILIEIPKYNSEILNINIILNRYDRDNNLIDLSGYGANVEYDGVELNDKN
888
898 QPKLTSTNSTNSEIRVTQONQNIIFNSMFLDFSFSFWIRIPKYXNDGIQNYIHNRYTIINCIRK
950
958 NNSGMKISIRGNRIIWTLTIDNGKTSVFFEYSIREDISDYINRW
...
1008 TNNSDNAKIYINGKLESNIDIKDIGEVIANGEIIFKLDGIDIRDTQFIWMKYFSIFNTELS
1058
1068 QSNKEIYKIQSYSEYELKDFWGNPLMYNKYMFNAGNKNYSYIKLKKDSSVGBILTRSKY
1080
1128 NONSNVINTRNLYIGEKFTIRKSKNSQSNDDIVRKEDYIYLDFFNSRNEWRYAYKDKF
1133
...
1136
1166
1183
```

```
1188 EBEKCLFLANIYDSNEFYKTIQIKKEYDEQTYSCQLLFXKDEESTDEIGLIGHRFYESG
1205
1248 IVLKDYKNYFCISCKWYLKEVKRKPYNPNLGCNWQFIPKDEGWIE
1253
1256
-----
18 matches found in sequence:
q8khu9 : HA-70.
(from "bt_spt.pep")
TOIG of: q8khu9 check: 9252 from: 1 to: 626

ID Q8KHU9 PRELIMINARY; PRT; 626 AA.
AC Q8KHU9;
DT 01-OCT-2002 (TREMELrel. 22, Created)
DT 01-OCT-2002 (TREMELrel. 22, Last sequence update)
DT 01-JUN-2003 (TREMELrel. 24, Last annotation update)
DE HA-70.
GN HA70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=62A, and Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461538; AAM75949.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
SQ SEQUENCE 626 AA; 71391 MW; 6137CB6D64BDE32C CRC64;

Q8KHU9 Length: 626 September 1, 2004 07:07 Type: P Check: 9252
Found using 'seq23' (hayes346.key)

1 MNSSIKIYNDIQEKVINYSDTIDLADGNYVVRGDMILSRQNQILGGSVISNGSGTIV
9 12

61 GD
...

68 NAIPYYPTPSFNEEYIKNNIQVFTNFTEANQIPIGFBFSKTAPSNNKLYMYLQYTYIR
118 123
128 125

128 YBIIKVLQHEITERAVLYVPSIGYVKSEIEFNGEKINKDFYFLTNDKCILNEQFYKKLL
128 183
128

188 ETTKNIPTNINFSKVSSTQRLVPYNSGLYVINKGDGYIRTNDKDLIGT
...

260 FTTSNDTKFSQQYTEERLKDAPNVQLFNTSTSLFKFVEEAPSDKNICIKAYNTYKYEI
1136
```

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320 DYQNGSIVNKAEEYVPSLGECEVNTAPSPSEVVMQVAEDGFIQNGPEBEIVGVIDPS
339
380 ENIQEINTAISDNVTYNI PGIVNNPPYILFTVNTTGTGIYKINAQNPLPSLKIVEAIGSGN
407
440 RNFQSGNLCDDDKAINIYITGFDSPNAKSVLVLNKKDKNYIRVPQPTSSNIENQIQFKR
469
500 BEGLRLNMSSVNIIDNLNSTGHHYTRQSPDVHDIYSVEFTIPGNFNKDTSNIRLYT
536
560 SYNGIGITLFRVTEIDYGNLNIQQNLHLNNTSIRLLNGAIYILKVEVTELNYYNIR
578
620 LHIDITN

-----
3 matches found in sequence:
q8ku10 : Putative flagellin (Fragment).
TOIG of: q8ku10 check: 339 from: 1 to: 211

ID Q8KU10 PRELIMINARY; PRT; 211 AA.
AC Q8KU10;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR GO; GO:0003796; F:lysozyme activity; IEA.
DR GO; GO:0016998; P:cell wall catabolism; IEA.
DR GO; GO:0009253; P:peptidoglycan catabolism; IEA.
DR InterPro; IPR002053; Glyco_hydro_25.
DR InterPro; IPR002477; PG_binding.
DR Pfam; PF01183; Glyco_hydro_25; 1.
DR Pfam; PF01471; PG_binding_1; 1.
DR SMART; SM00641; Glyco_25; 1.
SQ SEQUENCE 211 AA; 24392 MW; 26B3FCFB60C9FF2D CRC64;

-----
3 matches found in sequence:
q8ku10 : Putative flagellin (Fragment).
TOIG of: q8ku10 check: 339 from: 1 to: 211

ID Q8KU10 PRELIMINARY; PRT; 211 AA.
AC Q8KU10;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461542; AAM75964.1; -.
FT NON TER 1
SQ SEQUENCE 211 AA; 24392 MW; 26B3FCFB60C9FF2D CRC64;

-----
Q8KU10 Length: 211 September 1, 2004 07:07 Type: P Check: 339
Found using 'seq23' (hayes346.key)

...

111 EITTYEKEIIANNKSNKKNQIAFELSNNKKTITFAINNKDINLYIPDEEVSFDSIDL
161

171 NSSNIIEKVLSELNNQNYIGIKTNELEYKLNFEQNNQIL
187
190

-----
7 matches found in sequence:
q8ku11 : Lyca.
(from "bt_spt.pep")
TOIG of: q8ku11 check: 1017 from: 1 to: 316

```

```

ID Q8KU11 PRELIMINARY; PRT; 316 AA.
AC Q8KU11;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Lyca.
DE Lyca.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=NCTC 2916;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR GO; GO:0003796; F:lysozyme activity; IEA.
DR GO; GO:0016998; P:cell wall catabolism; IEA.
DR GO; GO:0009253; P:peptidoglycan catabolism; IEA.
DR InterPro; IPR002053; Glyco_hydro_25.
DR InterPro; IPR002477; PG_binding.
DR Pfam; PF01183; Glyco_hydro_25; 1.
DR Pfam; PF01471; PG_binding_1; 1.
DR SMART; SM00641; Glyco_25; 1.
SQ SEQUENCE 316 AA; 35168 MW; 66AC67FE09D06701 CRC64;

-----
Q8KU11 Length: 316 September 1, 2004 07:07 Type: P Check: 1017
Found using 'seq23' (hayes346.key)

...

26 FAIRAGYGNKNDKQFINNANGCTSVGMFGLYWFYSYATENMARKEAQYCVAAQAKYK
130

86 ISYPICYDLEVDITIRYANCGVTITKSLATQWHAFCQEVERNGYFAMNYSNQDFLLNKF
96 99

146 DSNLLKRYALWYAMYNNSLNRTCGIWOYSENGRVPGIAGAVDNMYCYLNNPGASNTSPN
153 157 191 193

206 KNAPRGVHYLIRELQQEINSQGLGEVVVDGIAGQATINSAP

-----
3 matches found in sequence:
q8ku12 : Putative flagellin (Fragment).
(from "bt_spt.pep")
TOIG of: q8ku12 check: 5098 from: 1 to: 261

ID Q8KU12 PRELIMINARY; PRT; 261 AA.
AC Q8KU12;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DT 01-OCT-2002 (TrEMBLrel. 22, Last annotation update)
DE Putative flagellin (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Hall A-hyper;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum

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RT type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461540; AAM75955.1; -.
FT NON TER 1
SQ SEQUENCE 261 AA; 29798 MW; 877B6E21D5D7FD72 CRC64;

Q8KUI2 Length: 261 September 1, 2004 07:07 Type: P Check: 5098
Found using 'seq23' (hayes346.key)

...

111 EITVDFEKLIANDKSNKNKQIVFELTNKKKALDINSKDVNLYISDEYNSFDSIDIL
161
171 NSPNIIGKVLSELKNQYVIGIKTNEVLEKLNFEQNQILEETLTKIQSIDIAKELVE
187
190
231 KSKNEILVNTNAV

...

2 matches found in sequence:
q8kul3 ; NTNH (Fragment).
(from "bt_spt.pep")
TOIG of: q8kul3 check: 8442 from: 1 to: 197

ID Q8KUL3 PRELIMINARY; PRT; 197 AA.
AC Q8KUL3;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE NTNH (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=G2A;
RA Dineen S.S., Bradshaw M., Johnson E.A.;
RT "Comparison of the neurotoxin gene clusters in Clostridium botulinum
type A strains.";
RL Submitted (DEC-2001) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF461538; AAM75948.1; -.
DR GO; GO:0009420; C:flagellar filament (sensu Bacteria); IEA.
DR GO; GO:0005198; F:structural molecule activity; IEA.
DR GO; GO:0001539; P:ciliary/flagellar motility; IEA.
DR InterPro; IPR001492; FlagellinN.
DR Pfam; PF00669; Flagellin N; 1.
DR PRODOM; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 452 AA; 51691 MW; 8B99DECA478AB59 CRC64;

Q8KUI4 Length: 452 September 1, 2004 07:07 Type: P Check: 1982
Found using 'seq23' (hayes346.key)

...

302 EITVDFEKLIANDKSNKNKQIVFELTNKKKALDINSKDVNLYISDEYNSFDSIDIL
352
362 NSPNIIGKVLSELKNQYVIGIKTNEVLEKLNFEQNQILEETLTKIQSIDIAKELVE
378
381
422 KSKNEILVNTNAV

...

24 matches found in sequence:
q8kzm3 ; Type E botulinum toxin.
(from "bt_spt.pep")
TOIG of: q8kzm3 check: 6924 from: 1 to: 1252

ID Q8KZM3 PRELIMINARY; PRT; 1252 AA.
AC Q8KZM3;
DT 01-OCT-2002 (TrEMBLrel. 22, Created)
DT 01-OCT-2002 (TrEMBLrel. 22, Last sequence update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL 5262;

...

60 DGIYDSNFLSQSDKDKFLQAIITLLKRINSTNAGEKLLSLSTAIPFYGGYYA
110
120 PNMITGSAKSNKLNLSLSTIPFYAGYRETNLYLSSSDNKSFYASNIVIFGPGANIV
147
```

RA Tsukamoto K., Mukamoto M., Kohda T., Ihara H., Wang X., Maegawa T.,
 RA Nakamura S., Karasawa T., Kozaki S.;
 RT "Clostridium butyricum bont/E gene for type E botulinum toxin,
 RT complete cds.";
 RL Submitted (JUL-2002) to the EMBL/GenBank/DBJ databases.
 DR EMBL; AB088207; BAC05434.1; -.
 DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
 DR GO; GO:0008237; F:metallopeptidase activity; IEA.
 DR GO; GO:0015070; F:toxin activity; IEA.
 DR GO; GO:0008270; F:zinc ion binding; IEA.
 DR GO; GO:0009405; P:pathogenesis; IEA.
 DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
 DR InterPro; IPR008985; ConA like lec gl.
 DR InterPro; IPR002160; Kunitz legume.
 DR InterPro; IPR000395; Peptidase M27.
 DR InterPro; IPR006025; Pept M Zn BS.
 DR Pfam; PF01742; Peptidase M27; 1.
 DR PRINTS; PR00760; BONTOKILYSIN.
 DR PRODOM; PD001963; Bontoxilysin; 1.
 DR PROSITE; PS00142; ZINC PROTEASE; 1.
 SQ SEQUENCE 1252 AA; 143510 MW; 41B633BB744D3B41 CRC64;
 Q8KZM3 Length: 1252 September 1, 2004 07:07 Type: P Check: 6924 ..
 Found using 'seq23' (hayes346.key)

1 MPTINSFYNDPVNRTIYIKPGCQOFYKSFNMKMIWIIPERNVIGTIPQDFLPPTS 30 33

61 LKNGSSYDFNYLQSQEKDF

...

222 YGAKGIITKYITQKQNLITNIRGTNIEFLTGGTDLNITSQAQNDIYTNLLADYKK 272 279

282 IASKLSKVQVSNPLNPKYDVEAKYGLDKDASGIYSVINKNFNDIFKLYSFTFELAT 299

342 KFOVKCRQTYIGQYKFKLSNLLNDIYNSISGVNINLNKVNFRQGANLNPRIITPTG 355 357

402 RGLVKKIIR

...

472 ILNFNSBAPGLSDEKLNLTIONDAYIPKYSNGTSDIEQHDVNLNLFVFLYLDQKVPGE 522

532 ENNVNLTSSIDTALLEQPKIYTFSSFEFINNVKPVQAALEVGWIQQVLVDFTTEANOKS 552

592 TVDKIADISIVPYIGLAINIGNEAQNKGNDKALELLGAGILLSEPELLIPTILVFTIK 605

652 SFLGSSDNKNKVIKAINNALKERDEKKEVYSFIVSNWMTKINTQFKRKEQMYCALQNG 705

712 VNALKAITESKYSNYSLEEKNELTNKYDIEQIENELNOKVSIAMNNIDRFLTESSISYIM 723

772 KLINE

...
 855 MRYKNDKVDVTSGYDSNININGDVYKPTNKQFGIYNDKLSSEVNIQNDYIIYDNKYKN 905 912
 915 FSIQFWVRIPNYDNKIVNVNNEYTIICMRDNNNGWVSLNHNHNIITWLTQDNGSINQKLA 937
 975 FNYGNANGISIDYINKWIFVTITNDRLGSKLYINGNLIDKKSILNLGNIHVSDNLFKIV 977
 1035 NCSTRYIGIRYFNIQFKELDETEIQIYLYNNEPNANILKDFWGNLYLLYDKKEYYLLNLVLP 1038 1046 1079 1086
 1095 NNFNRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTNDNLVRKNDQVYINPVA 1122 1149
 1155 SKTHLLPLYADTATNKEKTIKISSGNRFNQVYVVMNSVGNCTMNFQNNNGNIGLIGF
 1215 KADTVVASTWYTHMRDNTNSNGFFWFISEHGQEK 1226

 2 matches found in sequence:
 q8qzs2 ; Similar to ras-related C3 botulinum toxin substrate 3 (Rho family,
 (from "bt_spt.pep")
 TOIG of: q8qzs2 check: 1953 from: 1 to: 195

ID Q8QZS2 PRELIMINARY; PRT; 195 AA.
 AC Q8QZS2;
 DT 01-JUN-2002 (TrEMBLrel. 21, Created)
 DT 01-JUN-2002 (TrEMBLrel. 21, Last sequence update)
 DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
 DE Similar to ras-related C3 botulinum toxin substrate 3 (Rho family,
 DE small GTP binding protein Rac3) (Fragment).
 OS Mus musculus (Mouse)
 OC Eukaryota; Metazoa; Chordata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 OX NCBT_TaxID=10090;
 RN [1]
 RP SEQUENCE FROM N.A.
 RA Strausberg R.;
 RL Submitted (MAR-2002) to the EMBL/GenBank/DBJ databases.
 CC -1- SIMILARITY: BELONGS TO THE SMALL GTPASE SUPERFAMILY. RHO FAMILY.
 DR EMBL; BC025842; AAH25842.1; -.
 DR GO; GO:0005525; F:GTP binding; IEA.
 DR GO; GO:0003931; F:Rho small monomeric GTPase activity; IEA.
 DR GO; GO:0007264; P:small GTPase mediated signal transduction; IEA.
 DR InterPro; IPR003578; GTPase Rho.
 DR InterPro; IPR001806; Ras trnsfrmg.
 DR InterPro; IPR005225; Small_GTP.
 DR Pfam; PF00071; ras; 1.
 DR PRINTS; PR00449; RASTRNSFRMNG.
 DR SMART; SM00174; RHO; 1.
 DR TIGRFAMs; TIGR00231; small gtp; 1.
 KW GTP-binding; Lipoprotein; Prenylation.
 FT NON_TER 1
 SQ SEQUENCE 195 AA; 21327 MW; 39A765892EAB897B CRC64;

Q8QZS2 Length: 195 September 1, 2004 07:07 Type: P Check: 1953 ..
 Found using 'seq23' (hayes346.key)

...

|--|

17 HASAHASAHASAHASAGEYIPTVFDDNYSANVMVDGKPVNLGLWDTAGQEDYDRLRPLSY
67 70

77 QTDVFLICFSLVSPASFENVRAKWPVVRHCHPTILLVGTKLDRDDKDTIERLRDCK
| -- |
101

137 LAPITYOGLAMAREIGS

...

27 matches found in sequence:
q933k0 ; Type B cryptic neurotoxin.
(from "bt_spt.pep")
TOIG of: q933k0 check: 9700 from

Q933K0	PRELIMINARY; PRT; 1291 AA.
Q933K0;	
AC	01-DEC-2001 (TREMBlrel. 19, Created)
DT	01-DEC-2001 (TREMBlrel. 19, Last sequence update)
DT	01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE	Type B cryptic neurotoxin.
OS	Clostridium botulinum.
OS	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC	Clostridium.
OX	NCBI_TaxID=1491;
RN	[1]
RP	SEQUENCE FROM N.A.
RC	STRAIN=593, and 588;
RA	Kitna N., Ferreira J.L., Baumstark B.R.;
RT	"Characterization of six type A strains of Clostridium botulinum that
RT	contain type B toxin gene sequences.";
RL	Submitted (Aug-2000) to the EMBL/GenBank/DBJ databases.
DR	EMBL; AF300466; AAL11499.1; -
DR	EMBL; AF300465; AAL11498.1; -
DR	GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR	GO; GO:0008237; F:metallopeptidase activity; IEA.
DR	GO; GO:0015070; F:toxin activity; IEA.
DR	GO; GO:0008270; F:zinc ion binding; IEA.
DR	GO; GO:0009405; P:pathogenesis; IEA.
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR	InterPro; IPR004985; ConA_like lec_gl.
DR	InterPro; IPR002160; Kunitz_legume.
DR	InterPro; IPR000395; Peptidase_M27.
DR	InterPro; IPR006025; Pept M Zn BS.
DR	Pfam; PF01742; Peptidase_M27; 1.
DR	PRINTS; PR00760; BONTOXILYSIN
DR	ProDom; PD001963; Bontoxilysin; 1.
DR	PROSITE; PS00142; ZINC_PROTEASE; 1.
DR	Neurotoxin.
Q933K0	PRELIMINARY; PRT; 1291 AA.
Q933K0;	
AC	01-DEC-2001 (TREMBlrel. 19, Created)
DT	01-DEC-2001 (TREMBlrel. 19, Last sequence update)
DT	01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE	Type B cryptic neurotoxin.
OS	Clostridium botulinum.
OS	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC	Clostridium.
OX	NCBI_TaxID=1491;
RN	[1]
RP	SEQUENCE FROM N.A.
RC	STRAIN=593, and 588;
RA	Kitna N., Ferreira J.L., Baumstark B.R.;
RT	"Characterization of six type A strains of Clostridium botulinum that
RT	contain type B toxin gene sequences.";
RL	Submitted (Aug-2000) to the EMBL/GenBank/DBJ databases.
DR	EMBL; AF300466; AAL11499.1; -
DR	EMBL; AF300465; AAL11498.1; -
DR	GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR	GO; GO:0008237; F:metallopeptidase activity; IEA.
DR	GO; GO:0015070; F:toxin activity; IEA.
DR	GO; GO:0008270; F:zinc ion binding; IEA.
DR	GO; GO:0009405; P:pathogenesis; IEA.
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR	InterPro; IPR004985; ConA_like lec_gl.
DR	InterPro; IPR002160; Kunitz_legume.
DR	InterPro; IPR000395; Peptidase_M27.
DR	InterPro; IPR006025; Pept M Zn BS.
DR	Pfam; PF01742; Peptidase_M27; 1.
DR	PRINTS; PR00760; BONTOXILYSIN
DR	ProDom; PD001963; Bontoxilysin; 1.
DR	PROSITE; PS00142; ZINC_PROTEASE; 1.
DR	Neurotoxin.
Q933K0	PRELIMINARY; PRT; 1291 AA.
Q933K0;	
AC	01-DEC-2001 (TREMBlrel. 19, Created)
DT	01-DEC-2001 (TREMBlrel. 19, Last sequence update)
DT	01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE	Type B cryptic neurotoxin.
OS	Clostridium botulinum.
OS	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC	Clostridium.
OX	NCBI_TaxID=1491;
RN	[1]
RP	SEQUENCE FROM N.A.
RC	STRAIN=593, and 588;
RA	Kitna N., Ferreira J.L., Baumstark B.R.;
RT	"Characterization of six type A strains of Clostridium botulinum that
RT	contain type B toxin gene sequences.";
RL	Submitted (Aug-2000) to the EMBL/GenBank/DBJ databases.
DR	EMBL; AF300466; AAL11499.1; -
DR	EMBL; AF300465; AAL11498.1; -
DR	GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR	GO; GO:0008237; F:metallopeptidase activity; IEA.
DR	GO; GO:0015070; F:toxin activity; IEA.
DR	GO; GO:0008270; F:zinc ion binding; IEA.
DR	GO; GO:0009405; P:pathogenesis; IEA.
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR	InterPro; IPR004985; ConA_like lec_gl.
DR	InterPro; IPR002160; Kunitz_legume.
DR	InterPro; IPR000395; Peptidase_M27.
DR	InterPro; IPR006025; Pept M Zn BS.
DR	Pfam; PF01742; Peptidase_M27; 1.
DR	PRINTS; PR00760; BONTOXILYSIN
DR	ProDom; PD001963; Bontoxilysin; 1.
DR	PROSITE; PS00142; ZINC_PROTEASE; 1.
DR	Neurotoxin.
Q933K0	PRELIMINARY; PRT; 1291 AA.
Q933K0;	
AC	01-DEC-2001 (TREMBlrel. 19, Created)
DT	01-DEC-2001 (TREMBlrel. 19, Last sequence update)
DT	01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE	Type B cryptic neurotoxin.
OS	Clostridium botulinum.
OS	Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC	Clostridium.
OX	NCBI_TaxID=1491;
RN	[1]
RP	SEQUENCE FROM N.A.
RC	STRAIN=593, and 588;
RA	Kitna N., Ferreira J.L., Baumstark B.R.;
RT	"Characterization of six type A strains of Clostridium botulinum that
RT	contain type B toxin gene sequences.";
RL	Submitted (Aug-2000) to the EMBL/GenBank/DBJ databases.
DR	EMBL; AF300466; AAL11499.1; -
DR	EMBL; AF300465; AAL11498.1; -
DR	GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR	GO; GO:0008237; F:metallopeptidase activity; IEA.
DR	GO; GO:0015070; F:toxin activity; IEA.
DR	GO; GO:0008270; F:zinc ion binding; IEA.
DR	GO; GO:0009405; P:pathogenesis; IEA.
DR	GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR	InterPro; IPR004985; ConA_like lec_gl.
DR	InterPro; IPR002160; Kunitz_legume.

ID Q93G71 PRELIMINARY; PRT; 1291 AA.
AC Q93G71;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DE 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1436;
RA Kirma N., Ferreira J.L., Baumstark B.R.;
RT "Characterization of six type A strains of Clostridium botulinum that
RT contain type B toxin gene sequences.";
RL Submitted (AUG-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AF295926; AAK97132.1; -.
DR GO; GO:0004866; F:metallopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006308; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept_M27_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
SQ SEQUENCE 1291 AA; 150824 MW; D7CA07BAE2EB8CD2 CRC64;
Q93G71 Length: 1291 September 1, 2004 07:07 Type: P Check: 8413 ..
Found using 'seq23' (hayes346.key)
1 MSVTINNENYNDPIDNDNIIMMEPPFARGTRYKAFKIDTRIWILPERYTFGYKPEDFN
33 36
34 37
61 KSGSIFNRDVCYYDPDYLNTNDKKNI
...
149 ERKKGIFANLIIFGPGVLENETIDIGIQNHFASREGFGGIMQMKTCPYVSVFNNVQE
199
209 NKGASIFNRGYSFDPALILMHLELIHVLHGLYGIKVNLDPIVPNEKKFFMQSTDAIQAE
269 LYTGGQDPSIISPTDKSYDKVLQNPGRGIVDRNLKVLVCISDPNININYNKFKDKY
289 328
329 KFVEDSGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKLLD
331 349
389 NEIYTBEGFNISDKNMEKEYRGQNKAINQAYEISKEHLAVYKIQMCKSVKAFGICD
421
449 VDNEDLFFIADKNSFSDLLSKNERIA
...
520 EYKQPAIKIFTIDENTIFQVLYSQTFPDIIDINDISLTSSPFDALLFSNKKVYVFFSMDYIK
570

580 TANKVVEAGLFAGWVKQIVDDFVIEANKSSTMDKIADISLIVPYIGIALNVGNETAKGNF
623
640 ENAFETAGASILLEFPELIPVVGAFLLSEYIDNKNKIETINSALTUKRDEKWMYGL
697
700 IVAQWLSTVNTQFYTIKEGMYKALNYQAALAEELIKYKYNISSEKERSNINIDFNDVNSK
700 720
760 LNEGINOADINNNFINNECSVSYLMKKMIFLA
...
838 FDLSTYTNNTILIEIFNKYNSDIILNIIILNRYRDNKLIIDLSGYGAKVYVDGVLKNDKN
888
898 QPKLTSSANSKIRVIQNIQNIIFNSMFLDFSVFWIRIPKYKNDGIQNIYHNEYTIINCMK
950
958 NNSGWKISIRGNMIITFLIDINGKIKSVFFEYSIKEDISEYINRWF
...
1008 TNSDNAKIYNGKLESHIDIRDIREVIANDEIIFKLDGNDIDRTQFTWMKYFSFNTELS
1058
1068 QSNTEIYKIQSYSEYLKDFWGNPLMYNKYMFNAGNKNKSYIKLKKDSPVGEILTRSKY
1080 1098 1109
1128 NQNSKIYNRDLYIGEKFIIIRKSNQSINDDIVRKEDYIYLDFFNLNQEWVRVYIKYFK
1133 1136 1166 1183
1188 KEEKLFLAPISDSDEFYNTIQIKEYDEQPTYSCQLLFKKDEESTDEIGLIGHRYESG
1205
1248 IVFKEYKDYFCISKWYLKEVKRKYNSKLGCNWQFIPKDEGWTE
1253 1256

30 matches found in sequence:
q93ht3 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q93ht3 check: 3077 from: 1 to: 1291
ID Q93HT3 PRELIMINARY; PRT; 1291 AA.
AC Q93HT3;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
GN NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;

```
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem. Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71749.1; -.
DR PIR; A43503; A43503.
DR PIR; S11291; A49777.
DR PIR; S46431; S46431.
DR GO; GO:0004866; F:endoropeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M.Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
SQ SEQUENCE 1291 AA; 148869 MW; 4A21DB35B8743CF8 CRC64;

Q93HT3 Length: 1291 September 1, 2004 07:07 Type: P Check: 3077 ..
Found using 'seq23' (hayes346.key)

...

152 INPSVIITGPENIIDPSTFKLTNTTAAQEGFGALSIISIPREMLTYSNATNDVGE
202
212 GRFSKSEFCWDPILLILMHLEINHAMHNLGIAIPNDQTISVTSNIFYSQYNKLVAEYI
258 267
272 AFGGPTIDLPKSARKYFEKALDYRSYAKRLNSITTANPSSFENKYIGEYKOKLRKYR
297 330
332 FVSESSEVTNENKFEVLYNELTQFTFBNYAKIYNQNRKIYLSNVTPTANILDDN
351 380
392 VYDIQNGFNIPKSNLVNLFMGQNLSPALRKVNPNMLYLF

...

466 IGDIDSVKTDIFLRKDINEETEVYYPDNVSDQVILSKNTSEHGQDLILYPSIDSESI
516
526 LPGENQVFDNRTQNVQVLYNSVYLESQKLSNDVEDFTFTRSIEEALDSAKYIYTFPL
547 579
586 ANKNVAGVQGLFLMWANDVVEDFTTILRKDTLKDIDSVSAIPIYIGPALNISVVRG

646 NFEAFAVTGVITLLEAFPEFTIPALGAFVYSKVQNERNEIKTIDNCLEQRIKRWKDSY
677 705
706 EWMGTWLSRIITQFNINISQMYDLSNYQAGAIKAKIDLEYKKYSGSDKENIKSQVENLK
708 725 746
766 NSLDVKISEAMNNINKFIRECSVTYLFKNMLPKV

...
Found using 'seq23' (hayes346.key)
```

```
881 NTLVDTSGYNAEVSSEGDVQLNFIFFDFPKLGSSGDRGKVIQVTONENIVNYSFESI
931 935
941 SFWIRINKWVSNLPGYTIIDSVKNNSGWSIGIISNFIQVFTLKQNEDESEQSINFSYDISNN
956
1001 APGYNKFFVTVTNMMGNMKIYINGKLDTIKVKELTGINFSKTITFEINKIPDGLIT
1004
1061 SDSDNINMMIRDFYIFAKELDGKDINILFNSLOYTNVVDYWGNDLRYNKEYYVNVIDYL
1074 1112
1121 NRYMYANSRQIVENTRRNNDFNEGKIIIKRIRGNTNDRVRGDIYFDMTINNKAYN
1123 1146 1169 1179
1181 LFMKNETMYADNHSTEDIYAIGLREQTKDINDNIIIFIQPMNNTYYVASQIFKSNFNGEN
1182
1241 ISGICSIGTVRPRLGGDWYRHNVLVPTVKQGNYSALLESTHMGFPVYSE
1273

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24 matches found in sequence:
q93ht4 ; NTNHA.
(from "bt spt.pep")
TOIG of: q93ht4 check: 1910 from: 1 to: 1196

ID Q93HT4 PRELIMINARY; PRT; 1196 AA.
AC Q93HT4;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE NTNHA.
GN NTNHA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem. Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71748.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:000508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec.gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
SQ SEQUENCE 1196 AA; 138726 MW; 4BD594175964AB53 CRC64;

Q93HT4 Length: 1196 September 1, 2004 07:07 Type: P Check: 1910 ..
Found using 'seq23' (hayes346.key)

...
```

```
60  DGGYDSNFLSQSERENFLQAIILLKRINNTISGKQLLSLSTAIPTFPYGGYSS
    |--|
120  PNITFGKTPSKNKLNSLVTSTIPFPFGGYRETYIESQNKNFYASNIVIFQGSNIV
    |--|
180  ENNVYYKKDAENGMTAEIVFQPLLITKYKFDYPAMELTCKLIKSLYFLYGIKPS
    |--|
240  DNLVVPYRLRTELDMKQFSQLNIIDLLISGGVDLEFINTNPWFNTSYFFNSIKMFEKYK
    |--|
300  NIYKTEIEGNAIGNDIKRLKQKQFQINVDIWNILNLYFCQSPNSIIPRFSNALKHFY
    |--|
360  RKQYTWDTYDNYNINGFVNGQINTKLPLSNKNTNIISKPEKVVNLVNNENISLMKSNIV
    |--|
420  GDGLKGTTEDFYSTYKIPYNEEYREYFENDSDNFPPLNNISIEVDISIPEIIDINPYKONS
    |--|
480  NLVPTQITSMTEVTTHTALSGINYLQAOITNNENFTLSSDFSKVSSKDKSLVYSFLDNL
    |--|
540  MSLYLETIKNDGPIDTKYIYLKVEFKNYSFDINLTQETIDSMCGINEVLWFGKALNIL
    |--|
600  NTSNSFVEEYQDSGAISLISKKNLREPNIIDISDLSGLSPKDLNKKLYEYISKNIIV
    |--|
660  YFKKIYFSFLDQWTEYYSQYFELICMAQSIQILAQESLVKQIVQNKFTDLSKASIPDPTL
    |--|
720  KLIRETTEKTFIDLSNESQISMNRYDNFLNKASICVFVEDIYPKFISYMEKYINNINIKT
    |--|
780  REFIQRCNTINDNEKSLINSYTFKTDIFKFLDIQSKNFFNSQVEQVMKEILSPYQLLL
    |--|
840  FASKGPNSEIIEDISGKNTLIQYTESIELVYGVNGESLYLKSPNETIKF
    |--|
914  DDKTRLIGNKVNCGWEIYFEDNGLVFPIIDSGNGQESVYLSNINDNWYIYISVDRLK
    |--|
974  DQLLIFINDKRVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLPITSEVIRNYP
    |--|
1034 SYLONSYIRDSSKSLLEYKNKYQLYNYVFPETSLYEVDNKNKSYLSLKNKTDGINISSVKF
    |--|
```

```
1094 KLINIDSKVVQKDECIICVLDTGTEKYLDISPENNRIQLVSSKDNAKKITVNTDLFRP
    |--|
1154 DCITFSYNDKYFSLSLRDGDYNNMICNDNNKVPKGAHLWILES
    |--|
-----
4 matches found in sequence:
q93ht5 ; HA-33.
(from "bt_spt.pep")
TOIG of: q93ht5 check: 5748 from: 1 to: 285

ID Q93HT5 PRELIMINARY; PRT; 285 AA.
AC Q93HT5;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-33.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N. A.
RC STRAIN=C-Voichi;
RA MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.:
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem. Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB1747.1;
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 6.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS00231; RICIN B LECTIN; 2.
SQ SEQUENCE 285 AA; 33040 MW; AE7DC4DD05B5F298 CRC64;

Q93HT5 Length: 285 September 1, 2004 07:07 Type: P Check: 5748
Found using 'seq23' (hayes346.key)

...

42  SGANQKRLIYDTNKQAYKIKVMDNTSLILTNAPLSVSVKTDNGDQWYLLQNYIS
    |--|
102  RNVLIIRNMPNLVLYQNIIDDTLMVSTQTSSNQOFFKFSNCIYESFNNSSTCKIQTSLTIK
    |--|
162  FIDKNQNSNNVTIWSWNGDNQKWKILYNESKWAYTLTICKNNYLTWTFSSIGNNVGTFR
    |--|
222  TEGNNDQYWFNFYLNLDASMYTISNFSNQSKFLDVNSGLADGTNVQVWDSNGTSAQKWI
    |--|
282  I
...
-----
4 matches found in sequence:
q93ht6 ; HA-17.
(from "bt_spt.pep")
TOIG of: q93ht6 check: 9078 from: 1 to: 146
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```
ID Q93HT6 PRELIMINARY; PRT; 146 AA.
AC Q93HT6;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA-17.
DE GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71746.1; -.
DR InterPro; IPR008903; Botulinum HA-17.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF05588; botulinum HA-17; 1.
DR SMART; SM00458; RICIN; 1.
DR SEQUENCE 146 AA; 16661 MW; 2145CE8A22023764 CRC64;

Q93HT6 Length: 146 September 1, 2004 07:07 Type: P Check: 9078 ..
Found using 'seq23' (hayes346.key)

1 1 MSSERTFLNGYKIKSLFNSLSLYSSGSLFSNTSSLDNQWKLEYISSNGPRFSN
24 27
24 matches found in sequence:
(from "bt_spt.pep")
TOIG of: q93ht7 check: 6460 from: 1 to: 179

61 VAEPNKYLAYNDYGFYLLSSSSNLSLWNPDKTAINSIICTLSIVNTDYAWTIYDNNNN
70 73 76
70 73
ITDQPI

121 ITDQPI

9 matches found in sequence:
q93ht7 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q93ht7 check: 6460 from: 1 to: 179

ID Q93HT7 PRELIMINARY; PRT; 179 AA.
AC Q93HT7;
DT 01-DEC-2001 (TrEMBLrel. 19, Created)
DT 01-DEC-2001 (TrEMBLrel. 19, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF-22.
DE GN ORF-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-Yoichi;
RX MEDLINE=21534265; PubMed=11676492;
RA Sagane Y., Kouguchi H., Watanabe T., Sunagawa H., Inoue K.,
RA Fujinaga Y., Oguma K., Ohyama T.;
RT "Role of C-Terminal Region of HA-33 Component of Botulinum Toxin in
RT Hemagglutination.";
RL Biochem Biophys. Res. Commun. 288:650-657(2001).
DR EMBL; AB061780; BAB71744.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
DR SEQUENCE 179 AA; 22009 MW; 906635B5786C8406 CRC64;
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Q93HT7 Length: 179 September 1, 2004 07:07 Type: P Check: 6460 ..
Found using 'seq23' (hayes346.key)

1 1 MNDLFVAIENLKHNDNQNFNIEMSLKKYIEKTSKKYNDLYDYLHLMKELIENLKL
36 39 43 46 51
39 42
40 43

61 NFENSEDLRKYSTIKRYCINICKKNRDKKIYNSEVTKYKIDAVNYSLCDNFEL
101 110

121 DLISILNYKEKQIIYMKFEGEGRKDNELRLRLSRQSIYKIRIKSLKLYPIVQLVNI
135 170

24 matches found in sequence:
q9far6 ; Type E botulinum toxin.
(from "bt_spt.pep")
TOIG of: q9far6 check: 8127 from: 1 to: 1255

ID Q9FAR6 PRELIMINARY; PRT; 1255 AA.
AC Q9FAR6;
DT 01-MAR-2001 (TrEMBLrel. 16, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=BL 6340/ATCC 43755/BL 5520/KZ 147;
RX MEDLINE=20509829; PubMed=11055954;
RA Wang X., Maegawa T., Karasawa T., Kozaki S., Tsukamoto K., Gyobu Y.,
RA Yamakawa K., Oguma K., Sakaguchi Y., Nakamura S.;
RT "Genetic Analysis of Type E Botulinum Toxin-Producing Clostridium
RT butyricum Strains.";
RL Appl. Environ. Microbiol. 66:4992-4997(2000).
DR EMBL; AB039264; BAB12249.1; -.
DR HSSP; PI0845; 3BTA.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC PROTEASE; 1.
DR SEQUENCE 1255 AA; 143918 MW; 1B557B9D85CD8E4D CRC64;

Q9FAR6 Length: 1255 September 1, 2004 07:07 Type: P Check: 8127 ..
Found using 'seq23' (hayes346.key)

1 1 MLYMPTINSFNYNDFVNNRTILYIKPGCCQYKFSNIMKNIWIIPERNVIGTIPQDFLP
33 36

61 PTSLKNGDSSYDFNYLQSDQEKDF
```

```
...
225 YGAKGTTTKYTIQKQNPILNIRGTNIEBFLPGGTDLNIIITSAQSNDRYTNLLADYKK
      |--| |--| |--|
      275 282
285 IASKLSKVQVSNPLNPNFKDVFQFEAKYGLDKDASGIYSVINKNFNDFKLYSFTFEDLAT
      |--| |--|
      302
345 KFOVKCRQTYIGQYKFKLSNLLNDSIYNISEGYNNLNKVNFRGQANLNPRIITPITG
      |--| |--|
      358 360
405 RGLVKLIIR
...
475 ILNFSESAFGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNLNFFVFLDAQKVP
      |--| |--|
      525
535 ENNVLTSSIDTALLEQPKIYTFPFSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS
      |--| |--|
      555
595 TVDKIADISIVVPYIGLALNIGNEAOKGNFKDALELLGAGILLEFEPPELLIPTILVFTIK
      |--| |--|
      608
655 SFLGSSDNKKVKIKAINNALKERDEKWKYVSVFVSNWMTKINTQPKRKEQMYALQNO
      |--| |--|
      685
715 VNALKAIIESKYSYTLSEKNELTNKYDIEQIENELNOKVSIAMNNIDRFLTESSISYLM
      |--| |--|
      726
775 KLINE
...
858 MRYKNDKYVDTSGYDSNININGDVYKYPTNKNQFGIYNDKLSVNIQNDRYIYDNKKYN
      |--| |--| |--|
      908 915
918 FSIQFWVRIPNVDNKNIVNVNNEYTIINCMDRDNNGWKVSLNHNBEIITLQDNGSINGKLA
      |--| |--|
      940
978 FNYGNANGISDYINKVITVTITNDRLGDSKLYINGNLIDKKSILNLGNHVSDNLFKIV
      |--| |--|
      980
1038 NCSYTRYIGIRYFNIPFKELDETEIQTLYNNEPANILKDFWGNLYLYDKXYLLNLVKP
      |--| |--| |--|
      1041 1049 1082 1089
1098 NNFNRRDSTLSINNIRSTILLANRLYSGIKVKIQRVNNSSTNDNLVRKNDQVYNFVA
      |--| |--|
      1125
1158 SKTHLLPLYADATATNKEKTIKISSGNRFNQVVVMSVGNCTMNFKNNGNNGIIGLF
      |--| |--|
      1229
1218 KADTVVASTWYTYTHMRDNTNSNGFPWFNFISEHGQOEK
      |--| |--|
      1229
-----
3 matches found in sequence:
q9k345 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pap")
TOIG of: q9k345 check: 4019 from: 1 to: 173

ID Q9K345 PRELIMINARY; PRT; 173 AA.
AC Q9K345; Q9KW91;
DT 01-OCT-2000 (T-EMBLrel. 15, Created)
DT 01-MAR-2001 (T-EMBLrel. 16, Last sequence update)
DT 01-OCT-2003 (T-EMBLrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Iwanai, and Tenno2;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
DR EMBL; AB040123; BAB07885.2; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON TER 1
FT NON TER 173
SQ SEQUENCE 173 AA; 19061 MW; 5A89702DE3ACED16 CRC64;

Q9K345 Length: 173 September 1, 2004 07:07 Type: P Check: 4019
Found using 'seq23' (hayes346.key)

...
13 ILNFSESAFGLSDEKLNLTIONDAYIPKYDSNGTSDIEQHDVNLNFFVFLDAQKVP
      |--| |--|
      63 66
73 ENNVLTSSIDTALLEQPKIYTFPFSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS
      |--| |--|
      93 96
133 TVDKIADISIVVPYIGLALNIGNEAOKGNFKDALELLGAGI
      |--| |--|
      146

-----
25 matches found in sequence:
q9k395 ; Type E botulinum toxin.
(from "bt_spt.pap")
TOIG of: q9k395 check: 2549 from: 1 to: 1251

ID Q9K395 PRELIMINARY; PRT; 1251 AA.
AC Q9K395;
DT 01-OCT-2000 (T-EMBLrel. 15, Created)
DT 01-OCT-2000 (T-EMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (T-EMBLrel. 25, Last annotation update)
DE Type E botulinum toxin.
GN BONT/E.
OS Clostridium butyricum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1492;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=LCL 095;
RA Wang X., Maegawa T., Kozaki S., Tsukamoto K., Kato H., Nakamura S.,
RA Karasawa T.;
RT "C. butyricum (LCL 095) gene for type E botulinum toxin.";
```



```
772 KLINE 723
...
855 MRYKNDKYVDTSGYDSNININGEIFIYPTNKNQTFIENSKPSEVNISQNDYIIYDNKYKN 905 912
|---| |---| |---|
915 PSISFWRIENYDNKVININNEYTIINCNRDNRNSGKVSLSLNHNEIITWLQDNARINOKLV 937
|---| |---| |---|
975 FKXGNANGISDYINKWIFVTITNDRLGSKLYINGHLIDQKSLNLGNHIVSDNILFKIV 977
|---| |---| |---|
1035 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNPNTNLKDFWGNLYLYDKGYLLNLVKP 1038 1046 1079 1086
|---| |---| |---|
1095 NNFDRRKDSTLSINNIRSTILLANRLYSGIKVKIQRVNDSSSTNDRFVRKNDQVYINYS 1122
|---| |---| |---|
1155 NSSSYLYADNTTDDKEKTIKSSSGNRFNQVVMNSVGNNTCNFKNNNGNIGLLGFK 1159
|---| |---| |---|
1215 ADTVVASTWYTHMRDHTNSNGCFWNPISEHGQXK 1225
|---| |---| |---|
3 matches found in sequence:
q9kw88 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw88 check: 4855 from: 1 to: 173

ID Q9KW88 PRELIMINARY; PRT; 173 AA.
AC Q9KW88;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=164-1;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
DR EMBL; AB040128; BAB07890.2; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19121 MW; 42F5822DE3B01F1F CRC64;

Q9KW88 Length: 173 September 1, 2004 07:07 Type: P Check: 4855
Found using 'seq23' (hayes346.key)
...

772 KLINE 723
...
855 MRYKNDKYVDTSGYDSNININGEIFIYPTNKNQTFIENSKPSEVNISQNDYIIYDNKYKN 905 912
|---| |---| |---|
915 PSISFWRIENYDNKVININNEYTIINCNRDNRNSGKVSLSLNHNEIITWLQDNARINOKLV 937
|---| |---| |---|
975 FKXGNANGISDYINKWIFVTITNDRLGSKLYINGHLIDQKSLNLGNHIVSDNILFKIV 977
|---| |---| |---|
1035 NCSYTRYIGIRYFNIFDKELDETEIQTLYSNPNTNLKDFWGNLYLYDKGYLLNLVKP 1038 1046 1079 1086
|---| |---| |---|
1095 NNFDRRKDSTLSINNIRSTILLANRLYSGIKVKIQRVNDSSSTNDRFVRKNDQVYINYS 1122
|---| |---| |---|
1155 NSSSYLYADNTTDDKEKTIKSSSGNRFNQVVMNSVGNNTCNFKNNNGNIGLLGFK 1159
|---| |---| |---|
1215 ADTVVASTWYTHMRDHTNSNGCFWNPISEHGQXK 1225
|---| |---| |---|
3 matches found in sequence:
q9kw88 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw88 check: 4855 from: 1 to: 173

ID Q9KW88 PRELIMINARY; PRT; 173 AA.
AC Q9KW88;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=164-1;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
DR EMBL; AB040128; BAB07890.2; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19121 MW; 42F5822DE3B01F1F CRC64;

Q9KW88 Length: 173 September 1, 2004 07:07 Type: P Check: 4855
Found using 'seq23' (hayes346.key)
...

13 ILNPNSESAPGLSDKLNLTIQDDAYIPKYDSNGTSDIEQHDVNLNVPVFFYLDQKVPEG 63 66
|---|
73 ENNVNLTSSIDTALLEQPKIYTFPSSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS 93 96
|---|
133 TVDKIADISIVVPYKGLNALNIGNEAQKGNFKDALELLGAGI 146
|---|
3 matches found in sequence:
q9kw89 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw89 check: 5007 from: 1 to: 173

ID Q9KW89 PRELIMINARY; PRT; 173 AA.
AC Q9KW89;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
DE Botulinum neurotoxin type E (Fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=5545;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
DR EMBL; AB040126; BAB07888.2; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19137 MW; 4178024F5BC4BF1F CRC64;

Q9KW89 Length: 173 September 1, 2004 07:07 Type: P Check: 5007
Found using 'seq23' (hayes346.key)
...

13 ILNPNSESAPGLSDKLNLTIQDDAYIPKYDSNGTSDIEQHDVNLNVPVFFYLDQKVPEG 63 66
|---|
73 ENNVNLTSSIDTALLEQPKIYTFPSSSEFINNVNKPQAAALFVGWIQQVLVDFTTTEANQKS 93 96
|---|
133 TVDKIADISIVVPYKGLNALNIGNEAQKGNFKDALELLGAGI 146
|---|
3 matches found in sequence:
q9kw90 ; Botulinum neurotoxin type E (Fragment).
(from "bt_spt.pep")
TOIG of: q9kw90 check: 5055 from: 1 to: 173

ID Q9KW90 PRELIMINARY; PRT; 173 AA.
AC Q9KW90;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-MAR-2001 (TrEMBLrel. 16, Last sequence update)
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DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Botulinum neurotoxin type E (fragment).
GN BONT/E.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=Biwak0;
RX MEDLINE=20575211; PubMed=11133447;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Rapid, Quantitative PCR Monitoring of Growth of Clostridium botulinum
Type E in Modified-Atmosphere-Packaged Fish.";
RL Appl. Environ. Microbiol. 67:206-216(2001).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=35396;
RA Kimura B.;
RL Submitted (MAR-2000) to the EMBL/GenBank/DBJ databases.
RN [3]
RP SEQUENCE FROM N.A.
RC STRAIN=35396;
RA Kimura B., Kawasaki S., Nakano H., Fujii T.;
RT "Real-time, quantitative PCR assay of Clostridium botulinum type E in
modified-atmosphere-packaged fish.";
RL Submitted (AUG-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB040125; BAB07887.2; -.
DR EMBL; AB040127; BAB07889.2; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0015070; F:toxin activity; IEA.
KW Neurotoxin.
FT NON_TER 1 1
FT NON_TER 173 173
SQ SEQUENCE 173 AA; 19151 MW; 41781916CF06AB1F CRC64;

Q9KW30 Length: 173 September 1, 2004 07:07 Type: P Check: 5055
Found using 'seq23' (hayes346.key)

...

13 ILNFSEAPGLSDEKLNLTIONDAVIPKYDSNGTSDIRQHDVNLNLFVYLDAAQKVPES
63 66
173 ENNVNLTSSIDTALLEQPKIYTFPFSSEFINNVNKPQAAALFVSWIQQVLVDFTTEANQKS
93 96
133 TVDKIADISIVPYIGLALNIGNEAQGNFKDALELLGAGI
146

-----
27 matches found in sequence:
q9lbr1: Neurotoxin.
(from "bt_spt.pep")
TOIG of: q9lbr1 check: 9713 from: 1 to: 1285

ID Q9LBR1 PRELIMINARY; PRT; 1285 AA.
AC Q9LBR1;
DT 01-OCT-2000 (TREMELrel. 15, Created)
DT 01-OCT-2000 (TREMELrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE Neurotoxin.
GN NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_TaxID=1491;
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
```

```
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947.";
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90661.1; -.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; P:zinc ion binding; IEA.
DR GO; GO:0008405; P:pathogenesis; IEA.
DR GO; GO:0008508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like lec gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR00395; Peptidase M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTXIDISIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1285 AA; 147352 MW; B63AFA487D570680 CRC64;

Q9LBR1 Length: 1285 September 1, 2004 07:07 Type: P Check: 9713
Found using 'seq23' (hayes346.key)

1 MTWVPKDFNYPVNDNDILYLRIPQNKLTTPVKAFMITQNIWIPERFSSDTNPISLKS
21 24
61 PPRPTSKYQSYDPSYLSSTDEQKDTFLKGIILFKRINERDIGKKLINLYLVGSPPMGDS
68 71
121 STPEDTFDTRHTTNIAVEKPFENGSKVNTNIITPSVLIFGPL
...
247 KRIRPQVSGFFSQDGNVQPEELYTFGGSDVEIIPQIERLQIREKALGHYKDIKRLNN
297
307 INKTIPTSSWSNIDYKRTIFSEKYNFDKNTGNFVNVNIDKFNLSYSDLTNNMSEVVYSQ
322 351
367 YNVKNTHYFSKHLYLPVFANILDDNIYTIINGFNLTGKFNIEGNIERNPALQKLSS
380 393
427 ESVVDLFTKVCRLTRNSRD
...
480 ETNVENYSDNFSLDSESLDAKVPTNPEAVDPLLPNNMPELVNPGEEVFYDDITKVDY
530

540 LMSYYLEAQKLSNNVENITLTTSVEEALGYSNKIYTFPLSLAEKVKNGVQAGLFINWAN
543 575
600 EVVEDFTTNMKKDTLDKISDVSAIIPYIGPALNIGNSALRCGNFKQAFATAGVAFLEGF
660 PEFTIPALGVFTFYSSIQEREKIITKIENCLQEVKRWKDSYQWVSVNWLSTRTTFRNHI
673 701
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720 SYOMDLSYQADAKAKIDLEYKKYSGDKNENKSNQVLENKNSLDVKISEAMNINKFI
721 742
780 RECSVYLFQMLPKV
...
877 NTLMDTSGYNAEVRVEGNVQLNPIFPDFKLGSGGDDRGKIVVTQNEINIVYNAMYESFSI
927 931
937 SFWIRINKWVSNLPGYTIIDSVKVNSGWSIGIISNFLVFTLKQENSEQDINFSDISK
952
997 AAGYNKWFVFTITTNMGMNMIYINGKLIDTIKVKELTGINFSTITFQMNKIPTGLIT
1000
1057 SDSDNINMWIRDFYIFAKELDKDINILFNSLQYTNVVKDYGWGNLRYDKYIMVNYM
1070 1090 1108
1117 NRYMSKKGIVFENTKKNNDPNEGKILIKIRGNTNDRVGENVLYFNTIIDNKQYS
1142
1177 LGMKPSRNLGTLVPLGALDQPMDEIRKYGSTFIQPCNTFDYVASQLFLSSNATTNRLG
1206
1237 ILSIGSYFKLGDYWFNHYHLYIPVIKIEHYASLLESTSTHWFVPVASE
1267
-----
24 matches found in sequence:
q9lbr2 ; NTNHA.
(from "bt_spt.pep")
TOIG of: q9lbr2 check: 3846 from: 1 to: 1196

ID Q9LBR2 PRELIMINARY; PRT; 1196 AA.
AC
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE NTNHA.
GN NTNHA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90660.1; -
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec_g1.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
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SQ SEQUENCE 1196 AA; 138454 MW; 5415088FF959513A CRC64;
Q9LBR2 Length: 1196 September 1, 2004 07:07 Type: P Check: 3846
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNPLSQDSERENFLQAIITLLKRINNTISGKQLLSLISTAIPFPYGYVGGGYSS
110
120 PNIFTFGKTPKSNKKNLSLVTSTIPFPFGGYRETNYESQNNKNFYASNIVI FPGSGNIV
180 ENNVICYKKDAENGMGTMAEILLFPQLLTYKYNKFYIDPAMELTKCLIKSLYFLYGIKPS
211 231
240 DDLVVPYRLRTELDNKQFSQLNIIDLLISGGVDLEFINTNPYWFNTSYFSNSIKWFEKYK
298
-|
300 NIYETEIEGNAIGNDIKLRKOKFQNSVQDIWNLNLNLYFSKEFNSIIPDRFSNALKHY
301
360 RKQYTMWDYGDNYNINFGVNGQINTKLPKSDKNTNIISKPEKVVNLVANNISLMKSNYI
363
420 GDGLKGTTEDFYSTYKIPYNEEYERENDSDNFPNNISIEVDSIPEIIDINPYKONS
431
480 DLLFTQITSTTEEVITHALPVNYLQAIITNENFTLSSDFSKVSSKDKSLVTSFLDNL
503 533
540 MSLYLETIKNDGPIDTKKYIWLKKEVFKNYSFDINLTQEIDSSCGINEVWTFGKALNIL
558 559
600 NTSNSFVEEYQNSGPISLISKKNLSEPNIEIDIPDLSLLGLSPKDLNNKLYEYSKNRV
651
660 YFRKIYENFLDQWWTEYYSQVFEIICMAKQSI LAQESVWKIIONKFTDLSKASIPDPTL
665 677 680
720 KLIKETTEKTFIDLSNESQISMNRVDNFLNKASICVFVEDIYPKFISYMEKYINNINIKT
761
780 REFIORTCINDEKSLINSYTFKTIIDFKELNIQAIKNFPNSQVEQVMKEMLSFYQLLL
835
840 FATRGPSNIIEDISGKNTLIQYTESVELVGVNGESLYLKSPPNETVEF
...
914 DDKTRLGNKVNCGWEIYFEDNGLVFEIIDSNGNQSVLSNVNNNNWYIYSIVDRLK
964
974 DQLLIFINDKNVANVSIEQIILNIYSTNVISLVNKNNSIYVEELSVDKPVASEEVIRNYF
1032
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1034 1035 1055 1077
SYLNSYIRDSKSLLEYNKNYQLYNYVPETSLYEVDNNKNSYLSLKNKTGINTPSVKF
1058
1094 1122
KLINIDESKGYVQKWECHICVSDGTEKVLDSPPNNRIQLVSSKDNNAKKTIVNTDLFRP
1122
1154 1164 1174
DCITFSYNDKYFSLRSDGYNMILCNDNNKVPKGAHLWLKS
1164 1174
-----
5 matches found in sequence:
q9lbr3 ; HA-33.
(from "bt_spt.pep")
TOIG of: q9lbr3 check: 9404 from: 1 to: 286

ID Q9LBR3 PRELIMINARY; PRT; 286 AA.
AC Q9LBR3;
DT 01-OCT-2000 (TREMELrel. 15, Created)
DT 01-OCT-2000 (TREMELrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-33.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90659.1;
DR InterPro; IPR008997; RicinB like.
DR Pfam; PF00652; Ricin_B_lectin; 6.
DR SMART; SM00458; RICIN; 2.
DR PROSITE; PS0231; RICIN_B_LECTIN; 2.
SQ SEQUENCE 286 AA; 33770 MW; 3A85BB6604FC430 CRC64;

Q9LBR3 Length: 286 September 1, 2004 07:07 Type: P Check: 9404
Found using 'seq23' (hayes346.key)

...

42 SGANQKRLIYDNTKQVYTIKVDNNTSLILTWADPLSSVSVKTDNTNNQYVLLQDIYS
92 95
102 RNVILRYMNPVLQYNTDITLIVSTQTSNNQPFKFSNCIYEALNNRNCKLQTLQNSD
144
162 RFSLKMLNSQIIVLMQWFDSSRQKWTIEYNETKSAYLKQENNRYLTIQNSNNVETY
207
222 QSTDLSIQYWNINYLNDASKYLQNLQDTRNVLVDYVNSQTANGTHVIVDSYHGNTNQW
230 243
282 IINLI
-----
4 matches found in sequence:
q9lbr4 ; HA-17.

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(from "bt_spt.pep")
TOIG of: q9lbr4 check: 9181 from: 1 to: 146

ID Q9LBR4 PRELIMINARY; PRT; 146 AA.
AC Q9LBR4;
DT 01-OCT-2000 (TREMELrel. 15, Created)
DT 01-OCT-2000 (TREMELrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE HA-17.
GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90658.1;
DR InterPro; IPR008903; Botulinum_HA-17.
DR Pfam; PF05588; botulinum_HA-17; 1.
SQ SEQUENCE 146 AA; 16704 MW; 0D3115E48B2AA6A7 CRC64;

Q9LBR4 Length: 146 September 1, 2004 07:07 Type: P Check: 9181
Found using 'seq23' (hayes346.key)

1 MSSERTFLPNGYKIKSLFSDSLYITYSGLSFLNTSSLDNQKWKLEYISSNGFRFSN
24 27
61 VAEPNKYLAYNDYGFYILYSSSSNSLWNPILKAINSIICTLSIVNTYATYIYDNNNN
67 70 73 76
70 73
121 ITDQPI
...
-----
19 matches found in sequence:
q9lbr5 ; HA-70.
(from "bt_spt.pep")
TOIG of: q9lbr5 check: 4116 from: 1 to: 623

ID Q9LBR5 PRELIMINARY; PRT; 623 AA.
AC Q9LBR5;
DT 01-OCT-2000 (TREMELrel. 15, Created)
DT 01-OCT-2000 (TREMELrel. 15, Last sequence update)
DT 01-JUN-2003 (TREMELrel. 24, Last annotation update)
DE HA-70.
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,
RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum type D Strain 4947."
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90657.1;
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.

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DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PRO1394; CLENTEROTOXN.
SQ SEQUENCE 623 AA; 70311 MW; DF4D7860465E48CE CRC64;

Q9LBR5 Length: 623 September 1, 2004 07:07 Type: P Check: 4116
Found using 'seq23' (hayes346.key)

...

20 NLADGVVNRGDCWILSRQNLGNISNNGCTAIVGDLRIRETATPYYPYPTASFNEEY
70 73
|--|
|--| |--| |--| |--|
|--| |--| |--| |--|
70 73

80 IRNVQVNFANFTEASEIPGIFERSKTAPSKNGLYMYLQYIYRIYEILKVLNRVIERAV
114 119 124
|--| |--| |--| |--|
116 121

140 LYVPSLGYAKSIERNSEGEIDKNFYFTSEOKCILNEKEFIYKIAETTTAKESDNNSTTN
179
|--|
|--| |--| |--| |--|
179

200 LNTSQTLIPNGLYVINKGDMYRTNDKDLIGTLTETNTSGSIIOPLRNTTTPLENT
307 313
|--| |--| |--|
307 313

260 SNPTLFSQETEARLDAFNQLENTSTTLKFVEAPDNKISMKAYNYEKYELINYO
269
|--| |--| |--|
307 313

320 NGNIADKAEYVPLSGKCVSDAPSQAPVETPVEQDGTQTPGNEIIVGVINPSENI
404
|--| |--| |--|
404

380 EEISTPDDTYNTIPTSIQNNACYVLFTNTTGVYKINQANLPLIIYESIGSDNNNI
429
|--| |--| |--|
429

440 QSNLTSNNIKAINVITGTDSSNAESVLIVSLIKNKYIYIRIPOISSSTTNQLIFKRELG
466
|--| |--| |--|
466

500 NISDLANSTWILDNLTSGTHYTTROSPDVGVNYSYQLTIPGDFNNIASSIFSFRTEFN
533
|--| |--| |--|
533

560 QGIGTLRLTESINGYLNLIITKNVSDLLNNVEPISLLNGATYIPRVKVTENNNIIFDA
575 583
|--| |--| |--|
575 583

620 YRNS
583
|--| |--| |--|
583

-----
9 matches found in sequence:
q9lbr6 ; ORF-22 (RNA polymerase sigma factor).
(from "bt_spt.pep")
TOIG of: q9lbr6 check: 5142 from: 1 to: 179

ID Q9LBR6 PRELIMINARY; PRT; 179 AA.
AC Q9LBR6;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE ORF-22 (RNA polymerase sigma factor).
GN ORF-22
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=D-4947;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Takizawa J.,

-----
27 matches found in sequence:
q9lbr7 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q9lbr7 check: 1026 from: 1 to: 1280

ID Q9LBR7 PRELIMINARY; PRT; 1280 AA.
AC Q9LBR7;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
GN NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89713.1; -.
DR PIR; A43503; A43503.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:proteolysis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147757 MW; DE124FFB6F68450B CRC64;
```

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RA Kawabe T., Murakami F., Muroga A., Nakatsuka M., Ohyama T.;
RT "Characterization of the Progenitor Toxin Components Produced by
RT Clostridium botulinum Type D Strain 4947.";
RL Submitted (FEB-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037920; BAA90856.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22104 MW; B1DFBD424044DDFA CRC64;

Q9LBR6 Length: 179 September 1, 2004 07:07 Type: P Check: 5142
Found using 'seq23' (hayes346.key)

1 MNDLYAIELNKHNDQHFDIEMSLKKYIEKTSKYNLYDYNDILYHLWKELIEINLK
36 39 43 46 51
|--| |--| |--| |--|
|--| |--| |--| |--|
36 39 43 46 51

61 NFNSELDLRKYISTSIKRYCINICKKKNRDKKIYNSEATYKKLEAVNVVSYLCEDEFFL
101
|--| |--| |--| |--|
101

121 DLASILNKEKQIYMKPFECRKDNETARRHLHSRQSIYKIRIKSLKLYPIVMQLVNI
135
|--| |--| |--| |--|
135

-----
27 matches found in sequence:
q9lbr7 ; Neurotoxin.
(from "bt_spt.pep")
TOIG of: q9lbr7 check: 1026 from: 1 to: 1280

ID Q9LBR7 PRELIMINARY; PRT; 1280 AA.
AC Q9LBR7;
DT 01-OCT-2000 (TrEMBLrel. 15, Created)
DT 01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin.
GN NT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89713.1; -.
DR PIR; A43503; A43503.
DR HSSP; P10845; 3BTA.
DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:proteolysis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Pept_M_Zn_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147757 MW; DE124FFB6F68450B CRC64;
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Q9LBS7 Length: 1280 September 1, 2004 07:07 Type: P Check: 1026 ..
Found using 'seq23' (hayes346.key)

...

58 LNKPRVTSKSGYDPNVILSTDSEKDTFLKEILKLFKRINSREIGEELIYRLATDIPFP
108

118 GNNNTPINTFDFVDFNSVDVKTRQGNVWKTGSINPSVIITGPRENIIDPETSTFKLTN

178 NTFAAQEGFGALSIISIPRFMLTYSNATNNVCEGRFSKSEFCMCDPILILMHLNHAMEN
202

238 LYGIATPNDRISSTVTSNIFYSQYKVKLEVAEYAFGGPTIDILPKSARKYFEEKALDYY
239 258 267 297

298 RSLAKLNSITTANPSSFNKYIGEYKQKIRKYRFVSVSSGEVADVDRNPKFAELYKELTQI
300 330

358 FTEFNKATYVQNRKLIYLSNVYTPVTANILDDNVYDIQNGFNIPKSNLVLFPMGQNLGR
363

418 NPALRKVPENMLYLF

...

466 IGDIDIKTDIFLSKIDINBETEVIDYDQVNSVDQVILSKNTSEHGQDLILYPIEGESQV
516

526 LPGENQVFDNRQNVLYNSVYLSQKLSQKSDNVEDFTTTSIEALDNGKVTYTPFKL
547

586 ADKVNQVQGLFLMADVVEDFTTNILRKDTLKDIDVSATIPYIGPALNITSVRRG

646 NTEAFVNTGVTILLEAFQFTIPALGAFVYSKVQERNEIITKIDNCLEQRIKRWKDSY
677

706 EWMIGTWLSRITTOFNFNISYQVYDLSNYQADAIFKDKIDLEYKYSQDKENIKSQVENLK
708 725 746

766 NSLDIKISEAMNNKIFRECSVTYLFKMLPKV

...

878 NKKNALVDTSNGNAEVRLEGDVQVNTIYTNDFKLSSGDKIIVNLANNILYSAIYENSSV
928

938 SFWIKISKDLTNSHNEYTIINSIKQSGWKLCIRNGNIEWILQDINRKYKSLIFDYSES
954 986

998 SHTGYTNKWFVFTITNNIMGYMKLYNGELKQSERIEDLNEVKLDKTIYVFGIDENIDNQ
1018

1058 MLWIRDFNIFSKELSNEDINIVVEGGILRNVIKDYWGPNLKFDTETYYIINDNVYDIYAP
1103

1118 KSNILVLQVYPPDRSKLYTGNPTIKSVSDKNPYRILNGDNIHFHMLYNSGKZWIIDTD

1178 TIYALIEGRECSKNCVYALKQSLGNIGYIGFISIKNIVSQNKYCSQIFSFMKNTMLLAD
1239 1250

1238 IYKPRFRFSFENAYTPVAVTNYETKLLSTSSFWKFIISRDPGWVE
1239 1250

24 matches found in sequence:
q9lbs8 : NTNHA.
(from "bt_spt pep")
TOIG of: q9lbs8 check: 4604 from: 1 to: 1196

ID Q9LBS8 PRELIMINARY; PRT; 1196 AA.
AC Q9LBS8;
DT 01-OCT-2000 (TREMELrel. 15, Created)
DT 01-OCT-2000 (TREMELrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMELrel. 25, Last annotation update)
DE NTNHA.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89712.1; ..
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA like lec gl.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOTOXISIN.
DR Prodom; PD001963; Bontotoxilisyn; 1.
SQ SEQUENCE 1196 AA; 138457 MW; DEB13981A2B057C0 CRC64;

Q9LBS8 Length: 1196 September 1, 2004 07:07 Type: P Check: 4604 ..
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNFLSQDSERENFLQAIITLLKRINNTISGKQLLSLISTAIPFPYGVGGYSS
110

120 PNIPTFGKTPKSNKKNLSLVSTIPFPFGYRETNVIESPNKKDFYASNIVIFGPGSNIV

180 ENNVICYKKNDAENGMTWAEILFQPLLTYKNKYFYIDPAMELTCKLIKSLYFLYGKPS
211 231

240 DGLWVYRLRTELDNKQFSQLNIIDLLISGGVDLEFINTPNYWFNTSNYSNSIKMPEKYK
298

300 NIYETIEIGNAIGNDIKLRKQKQFQNSVQDIWNLNLYNFSKFNFSIIPDRFSNALKHFY
301

360 RKQYTYMDVTDNVNININGFVNGQINTKPLPSDKNTNIIISKPEKVVNLVNNENISLMSKSNY
363

```

420  GDGLKGTTFDYSTYKIPYNEEVEYRENDSDNFPNNISIEEVDISIPEIIDINPYKONS
      |--|
      431
480  NLVPTQITSMTEVTHPALPYNLQQAQITTNENFTLSSDFSKVSVSKOKSLVYVFLDNL
      |--|
      503
540  MSLYLETIKNDGPIDTDKKYILWLKEVPKNYSFDINLTQETDSSCGINEVWFGKALNIL
      |--|
      558
      559
600  NTSNSFVEEYQNSGISLSKKONLSEPNIEIDIDIPDSLLGLSPKDLNKKLKEIYISKNIV
      |--|
      651
660  YFKKIYFNFLDQWMTYYSQVFELICMAKQSIQAESLVKQIIQNKFDTLSKASIPPDTL
      |--|
      665
      677
      680
720  KLIKETTEKTFIDLKESQISMRVDFNLKASTCVFVEDIYPKFISYMEKYINNINIKT
      |--|
      761
780  REFIQRCNINDNKESILINSYPTKTIIDFKELDIQGIKNFPNSQVEQMKEMLSFYQILL
      |--|
      835
840  FATRGPNSNIIEDISGKNTLIQYTESVELYGVNGESLYLKSPNETVEF
...
914  DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQESVYLSNVINNWWYISISVDRSK
      |--|
      964
974  DQLLIFINDKNVANVSIEQIILNIYSTNVISLVNKNNSIYVEELSVDLKTVTSEBIRNYP
      |--|
      1032
1034  SYLDNSYIRDSSKSLLEYNNKYOLYNYVFPKTSLYEVNDNKNKSLKNTDGINIPSVKFP
      |--|
      1035
      1055
      1058
      1077
1094  KLINIDESKGYVKWQDECIICVSDGTEKTYLIDISSENNRIQLVSSKDNAKKITVNTDLFRP
      |--|
      1122
1154  DCIIPFSYNDKYFSLSLRSDGYNMICNDNNKVPKGAHLWILES
      |--|
      1164
      1174
-----
5 matches found in sequence:
q9lbs9 ; HA-33.
(from "bt_spt.pap")
TOIG of: q9lbs9 check: 79 from: 1 to: 286

ID   Q9LBS9          PRELIMINARY;      PRT;   286 AA.
AC   Q9LBS9;
DT   01-OCT-2000 (TrEMBLrel. 15, Created)
DR   01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE   01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN   HA-33.
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

-----
5 matches found in sequence:
q9lbs9 ; HA-33.
(from "bt_spt.pap")
TOIG of: q9lbs9 check: 79 from: 1 to: 286

ID   Q9LBS9          PRELIMINARY;      PRT;   286 AA.
AC   Q9LBS9;
DT   01-OCT-2000 (TrEMBLrel. 15, Created)
DR   01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE   01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN   HA-33.
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;

```

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OC   Clostridium.
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=C-6814;
RA   Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA   Murakami F., Nakatsuka M., Ohyama T.;
RT   "Organization of Gene Encoding Components of the Botulinum Progenitor
RT   Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT   Chimeric Sequence in the Gene Encoding Each Component.";
RL   Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR   EMBL; AB037166; BAA89711.1; -.
DR   InterPro; IPR008997; RicinB lectin.
DR   InterPro; IPR000772; RicinB lectin; 6.
DR   Pfam; PF00652; RicinB lectin; 6.
DR   SMART; SM00458; RICIN_2.
DR   PROSITE; PS00231; RICIN_B_LECTIN; 2.
DR   PROSITE; PS00231; RICIN_B_LECTIN; 2.
SQ   SEQUENCE 286 AA; 33760 MW; D5F5ABC553A5F25B CRC64;

Q9LBS9 Length: 286 September 1, 2004 07:07 Type: P Check: 79
Found using 'seq23' (hayes346.key)
...
42  LGSNQKRLIYDTNKQAYKIKVMDNTSLILTWDAPLSSSVKTDNTNTNQYWYLLQDYIS
      |--|
      92
      95
102  RNVILRNYMNPNLVLQYNTDITLIVSTQTSNNOFFKFSNCIYEALANRNCKLOTQLNSD
      |--|
      144
162  RFLSKNLNSQIIIVLQWQFSDSRQKWLIEYNETKSAYTLKCOENNRNYLTWICNSNNYVETY
      |--|
      207
222  QSTDLSLYWNINYLNDASKYILYNLQDTRNVLVDVNSQIANGTNNIVDSYHGNTNQOW
      |--|
      230
      243
282  IINLI
-----
4 matches found in sequence:
q9lbt0 ; HA-17.
(from "bt_spt.pap")
TOIG of: q9lbt0 check: 9099 from: 1 to: 146

ID   Q9LBT0          PRELIMINARY;      PRT;   146 AA.
AC   Q9LBT0;
DT   01-OCT-2000 (TrEMBLrel. 15, Created)
DR   01-OCT-2000 (TrEMBLrel. 15, Last sequence update)
DE   01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
GN   HA-17.
OS   Clostridium botulinum.
OC   Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OX   NCBI_TaxID=1491;
RN   [1]
RP   SEQUENCE FROM N.A.
RC   STRAIN=C-6814;
RA   Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA   Murakami F., Nakatsuka M., Ohyama T.;
RT   "Organization of Gene Encoding Components of the Botulinum Progenitor
RT   Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT   Chimeric Sequence in the Gene Encoding Each Component.";
RL   Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR   EMBL; AB037166; BAA89710.1; -.
DR   InterPro; IPR008903; Botulinum HA-17.
DR   InterPro; IPR000772; RicinB lectin.
DR   Pfam; PF05588; botulinum_HA-17; 1.
DR   SMART; SM00458; RICIN; 1.

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SQ SEQUENCE 146 AA; 16651 MW; E245CCB5DF905899 CRC64;
Q9LBT0 Length: 146 September 1, 2004 07:07 Type: P Check: 9099
Found using 'seq23' (hayes346.key)

1 MSBRTFLPNGYKIKSLFNSLSLYLTYSSGALSFSNTSSLDNOKWKLEYISSNGFRFSN
24 27
121 ITDQPI
67 70 73 76
61 VAESNKLAYNDYGFYLSGSSSSNNSLWNPPIKAIINSYIICTLSIVNVTDYAWTIYDNNNN
70 73
19 matches found in sequence:
q9lbt1; HA-70.
(from 'bt_spt.pep')
TOIG of: q9lbt1 check: 4754 from: 1 to: 623

ID Q9LBT1 PRELIMINARY; PRT; 623 AA.
AC Q9LBT1;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-JUN-2003 (TREMBlrel. 24, Last annotation update)
DE HA-70.
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89709.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTERTOXN.
SQ SEQUENCE 623 AA; 70252 MW; 83BEC67E689F7CD5 CRC64;

Q9LBT1 Length: 623 September 1, 2004 07:07 Type: P Check: 4754
Found using 'seq23' (hayes346.key)

20 NLADGNVYVNRGDGWLRSQNQLGGNISNGGTAIVGLRIRRETATPYYPPTASFNSEY
70 73

80 IRNNVQNVANFTEASEIPIGFEFSKTPSNKSLYMYLOYTYIRVEIKVLQNTVIERAV
114 119 124
116 121

140 LYVPSLGVKSIENFNSGEQIDKNFYFTSEDKILNEKFTYKKAETTTAKESDNSNNTTN
179
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200 LNTSQTLPPNGLYVINKDGYMRTNDKDLIGTLLETNTSGSIIQPRIRNTTRPLENT
260 SNPTLFSQRYTEARLNDAFNIQLFNTSTALFKFVEEAPDNKNISMKAYTYEKYELINYQ
269 307 313
310
320 DGNIAKAEYLLPSLGKCEVSDAPSPQAFVETPVDDGFIQTGPNEIIIVGVNPSNI
380 EBISTPIPDYTYNIPTSIQNACVYLVFTVNTGVYKINAKNNLPLLIYESIGSDNNI
404 429
440 QSNLTLSNNNIKAINYITGTDSANAEYSLIKKNKYVIRIPQISSSTTNQLFKRELG
466 478
500 NISDLANSTVNILDNLTSGTHYTRQSPDVGNYSYQLTIPGDFNNIASSIFSFRNN
533
560 QGIGTLYRLTESINGYNLTIKNYSDDLANNVEPISLLNGATYIFRVKVTLENNYNIIFDA
575 583 613
620 YRNS

-----
9 matches found in sequence:
q9lbt2; ORF-22 (RNA polymerase sigma factor).
(from 'bt_spt.pep')
TOIG of: q9lbt2 check: 6185 from: 1 to: 179

ID Q9LBT2 PRELIMINARY; PRT; 179 AA.
AC Q9LBT2;
DT 01-OCT-2000 (TREMBlrel. 15, Created)
DT 01-OCT-2000 (TREMBlrel. 15, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE ORF-22 (RNA polymerase sigma factor).
GN ORF-22.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=C-6814;
RA Sagane Y., Watanabe T., Kouguchi H., Yamamoto T., Kawabe T.,
RA Murakami F., Nakatsuka M., Ohyama T.;
RT "Organization of Gene Encoding Components of the Botulinum Progenitor
RT Toxin in Clostridium botulinum Type C Strain 6814: Evidence of
RT Chimeric Sequence in the Gene Encoding Each Component.";
RL Submitted (JAN-2000) to the EMBL/GenBank/DBJ databases.
DR EMBL; AB037166; BAA89708.1; -.
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22102 MW; 2285A9CD1BF2C7BB CRC64;

Q9LBT2 Length: 179 September 1, 2004 07:07 Type: P Check: 6185
Found using 'seq23' (hayes346.key)
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```
1 MNDLFYAIENTAKHDQHFNFIEMSLKKYIEKTSKKYNLYDYNDILYHLWKELIEINLK
36 39 43 46 51
39 42
40 43

61 NFNSELDLRKYISTISKRYCINICKKNRDKKIYNSEVYKKKLDVNVVSYLYCDNFEL
101 110
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121  DLISILNYKEQIIYMKFFECRKDNETARRHLRSQSIYKIRIKSLKLYPIVMQLVNI 170
      |---| |---|
      135
-----
25 matches found in sequence:
q9tg7 ; NTX (Fragment).
(from "bt_spt.pep")
TOIG of: q9tg7 check: 8808 from: 1 to: 1275

ID Q9QTG7 PRELIMINARY; PRT; 1275 AA.
AC Q9QTG7;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE NTX (Fragment).
GN NTX.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Oiyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RT botulinum type D strain, 1873."
RL Microbiol. Immunol. 42:599-605 (1998).
DR EMBL; AB012112; BAA75084.1; -
DR HSP; P10845; 3BTA.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA-like lec_gl.
DR InterPro; IPR002160; Kunitz legume.
DR InterPro; IPR000395; Peptidase_M27.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTOKILYSIN.
DR ProDom; PD001963; Bontokilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
FT NON_TER 1275 1275
SQ SEQUENCE 1275 AA; 146742 MW; 3C50F46C9233E2D6 CRC64;

Q9QTG7 Length: 1275 September 1, 2004 07:07 Type: P Check: 8808 ..
Found using 'seq23' (hayes346.key)

1 MTWPKVFNYSDFVNDNDILIRIPQNKLIITPVKAFMITONIWIPERFSSDTPNPSLSK
21 24 |---|

61 PPRPTSKYQSYDPSYLSSTDQKDTFLKGLIKFKRINERDIGKLLINLVVGSFPMGDS
68 71 |---|
109

121 STPDETFDTHRTTNAIEKPFENGSKWVTNIITPSVLIFGLP
...

247 KRIRPQVSEGFSGDQPNVQPEELYTFGLDVEIIPQIERSQLREKALGHYKDKAKRLNN
297 |---|

307 INKTIPSSWISNIDKYKXIFSEKYNFDKNTGNFVNIDKFNSYSLDNTVMSEVYSSQ
322 |---|
351

367 YNKNRTHYFSRHYLPVPANILLDDNIYTRDGNLTNKGFNIGNSGQNIERNPALQKLSS
|---|
[1]

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```
RP SEQUENCE.
RX MEDLINE=94000342; PubMed=8397793;
RA Gimenez J.A., DasGupta B.R.;
RT "Botulinum type A neurotoxins."
RT 45, 42, and 18 kD fragments."
RL J. Protein Chem. 12:351-363(1993).
DR HSSP; P10845; 3BTA.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR InterPro; IPR002160; Kunitz_legume.
SQ SEQUENCE 72 AA; 8165 MW; B7A959576A615E18 CRC64;

Q9R540 Length: 72 September 1, 2004 07:07 Type: P Check: 7100 ..
Found using 'seq23' (hayes346.key)

1 IYINSLYRGTFRIIKKYASGNKDNVRNDRYINVVVKNKEYRLATNASQAGVEKILS
34 37 44 47
61 ALEIPDVGNLYQ

-----
2 matches found in sequence:
q9r5h0 : Type E neurotoxin, type E NT=16 kDa fragment (Fragment).
(from "bt_spt.pep")
TOIG of: q9r5h0 check: 8046 from: 1 to: 60

ID Q9R5H0 PRELIMINARY; PRT; 60 AA.
AC Q9R5H0
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Type E neurotoxin, type E NT=16 kDa fragment (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE.
RX MEDLINE=93000392; PubMed=1388670;
RA Gimenez J.A., DasGupta B.R.;
RT "Pepsin fragmentation of botulinum type E neurotoxin: isolation and
RT characterization of 112, 48, 46, and 16 kD fragments."
RL J. Protein Chem. 11:255-264(1992).
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR InterPro; IPR002160; Kunitz_legume.
FT NON_TER 1 1
FT NON_TER 60 60
SQ SEQUENCE 60 AA; 6865 MW; 9EAB8CABFEAE766 CRC64;

Q9R5H0 Length: 60 September 1, 2004 07:07 Type: P Check: 8046 ..
Found using 'seq23' (hayes346.key)

1 LANRLYSGLKVKIQRYNNSSTNDNLVRKNDQVYINVFVASKTHLFLPYADTATTNKKXIK
6 9 33 36
61

-----
1 match found in sequence:
q9r5n5 : Neurotoxin type B HN+ 35 kDa SUBUNIT-BAND 3B (Fragment).
(from "bt_spt.pep")
TOIG of: q9r5n5 check: 7044 from: 1 to: 13

ID Q9R5N5 PRELIMINARY; PRT; 13 AA.
AC Q9R5N5
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE Neurotoxin type B HN+ 35 kDa SUBUNIT-BAND 3B (Fragment).
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
```

```
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE.
RX MEDLINE=92143938; PubMed=1781887;
RA Somers E., DasGupta B.R.;
RT "Clostridium botulinum types A, B, C1, and E produce proteins with or
RT without hemagglutinating activity: do they share common amino acid
RT sequences and genes?";
RL J. Protein Chem. 10:415-425(1991).
DR PIR; G44644; G44644.
FT NON_TER 13 13
SQ SEQUENCE 13 AA; 1539 MW; 00DB6E78247E2054 CRC64;

Q9R5N5 Length: 13 September 1, 2004 07:07 Type: P Check: 7044 ..
Found using 'seq23' (hayes346.key)

1 MSTYQNILNDKIV
4 7

-----
7 matches found in sequence:
q9r631 : Neurotoxin type B light chain, BONT/B.
(from "bt_spt.pep")
TOIG of: q9r631 check: 4044 from: 1 to: 451

ID Q9R631 PRELIMINARY; PRT; 451 AA.
AC Q9R631
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Neurotoxin type B light chain, BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=92340509; PubMed=1634516;
RA Kurazono H., Mochida S., Binz T., Eisel U., Quanz M., Grebenstein O.,
RA Wernars K., Poullain B., Tauc L., Niemann H.;
RT "Minimal essential domains specifying toxicity of the light chains of
RT tetanus toxin and botulinum neurotoxin type A."
RL J. Biol. Chem. 267:14721-14729(1992).
DR HSSP; P10845; 3BTA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0003405; F:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn_BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 451 AA; 51943 MW; 6C79FD488653EA71 CRC64;

Q9R631 Length: 451 September 1, 2004 07:07 Type: P Check: 4044 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNNDPIDNNNIMMPPPPARGTGRYYKAFKITDRIWIIPERYTGYKPEDFN
33 36 34 37
61 KSGGIFNRDVCYYDDYLDYLTNDKXNI
...
149 ERKKGIFANLIIFGPGFVLNENETIDIGIQNHFASREGFGGIMQMKECPYVSVFNNVQE
149
```

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209  NKGASIFNRRGYSFDPALILMHILHVLHGLYGIKVDLDPIVPNEKKFFMQSTDAIQABE      199
269  LYTFGGQDPSIITPSTDKSIYDKVLQNFGRGIVDRINKVLVCISDPSININITYKNKFKDKY      328
--|
329  KFVEDSBGKYSIDVESFDKLYKSLMFGFTETNIAENYKIKTRASYFSDSLPPVKIKNLLD      331
--|
389  NEIYTBEEGFNISDKMEKEYRGONKAINQAYEEISKEHLAVYKIQMCKSVKAPGICID      421
--|
449  VDN
-----
13 matches found in sequence:
q9r761 : HA-70 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r761 check: 7747 from: 1 to: 442

ID Q9R761 PRELIMINARY; PRT; 442 AA.
AC Q9R761;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA-70 protein (Fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins.";
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; Y13630; CAA73963.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
FT NON TER 442
SQ SEQUENCE 442 AA; 50255 MW; 6DE1BF01EEDF832B CRC64;

Q9R761 Length: 442 September 1, 2004 07:07 Type: P Check: 7747
Found using 'seq23' (hayes346.key)

```

```

1  MNSSIKIYNDIOEKVINSYDTIDLADGNVVRGDSWILSRQNIILGSGVINSNGTGIV      9 12
61  GD
...
68  NATPYPTSPSENEYIKNNIQVTNFTNTEANQIPIGYFESKTAPSKNKLYMYLQYTYIR      118 123
--|
120 125
--|

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128  YEIIKVLQHEIIRAVLYVPSGLYVKSTIEFNPGEKINKDFYFLTNDKCIILNEQFLYKKIL      183
128
188  ETKNIPITNNIFNSKVSSTORVLPSNGLYVINKDGYVIRTNDKDLIGT
...
260  PTTSDNTKFSQQYTEERLKDAPNVQLFNTSTSLPKFVEEAPSDKNICIKAYNTKYKELI      310 316
--|
320  DYQNGSIVNKAEEYVPSLGYCEVTINAPSPSEVVVMQVAEDGFIONGPEEEIVVGVIDPS      339
--|
380  ENIQEINTAISDNIYISIPGIVNNNNPFYILFTVNTTGIYKINAQNLPPLKIYEAGSGN      407 432
--|
440  RNM
-----
7 matches found in sequence:
q9r772 : Ha-17 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r772 check: 2875 from: 1 to: 158

ID Q9R772 PRELIMINARY; PRT; 158 AA.
AC Q9R772;
DT 01-MAY-2000 (TrEMBLrel. 13, Created)
DT 01-MAY-2000 (TrEMBLrel. 13, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ha-17 protein (Fragment).
GN HA-17.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Eklund 17B;
RX MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
RT botulinum neurotoxin complex in Clostridium Botulinum (clostridium
RT argentinense) type g and non-proteolytic clostridium botulinum type
RT b.";
RL Curr. Microbiol. 35:207-214(1997).
DR EMBL; Y09312; CAA70496.1; -.
DR InterPro; IPR008903; Botulinum_HA-17.
DR Pfam; PF05588; botulinum_HA-17; 1.
FT NON TER 1
SQ SEQUENCE 158 AA; 18517 MW; 0A24EDA3D543E8B2 CRC64;

Q9R772 Length: 158 September 1, 2004 07:07 Type: P Check: 2875
Found using 'seq23' (hayes346.key)

```

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1  EYHLYIKVNYMSVERTFLPDGNYNIKSIIFSGSLYLPVPSGSLTFSESSANNQKNVE      2 5 7 10 15
--|
61  YMAKRCFKISNVAEPNKYLSYDNFGFISLDSLNKCYWFPKIAVNTYIMLNKYNEL      79 82
--|
121  DYAWDIYDTNENILSQPLLLLPNFDIYNSQMLKLEKI      82 85
--|

```

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-----
13 matches found in sequence:
q9r773 : Ha-70 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9r773 check: 8038 from: 1 to: 442

ID Q9R773 PRELIMINARY; PRT; 442 AA.
AC Q9R773;
DT 01-MAY-2000 (TREMBlrel. 13, Created)
DT 01-MAY-2000 (TREMBlrel. 13, Last sequence update)
DT 01-JUN-2003 (TREMBlrel. 24, Last annotation update)
DE HA-70 protein (Fragment).
GN HA-70.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=Eklund 17B;
RC MEDLINE=97435242; PubMed=9290060;
RA Bhandari M., Campbell K.D., Collins M.D., East A.K.;
RT "Molecular characterization of the clusters of genes encoding the
botulinum neurotoxin complex in Clostridium Botulinum (Clostridium
argentinense) type g and non-proteolytic Clostridium botulinum type
b.";
RL Curr. Microbiol. 35:207-214 (1997).
DR EMBL; Y09312; CAA70495.1; -.
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTEROTOXN.
FT NON TER 442
SQ SEQUENCE 442 AA; 50198 MW; 160A5E4A7E746B84 CRC64;

Q9R773 Length: 442 September 1, 2004 07:07 Type: P Check: 8038
Found using 'seq23' (hayes346.key)

1 MNSSIKIYNHIOEKVINYSOTDILADGNVYVSRGDGWLRSQNLGSGVISNGSTGIV
9 12
61 GD
...

68 NAIPYYTPSPNEBYIKNNIQVTFNTEANQIPGFBSKTAPEFNKLNLYMLOQYIIR
118 123
120 125

128 YEIIKVLQHEIIERAVLYVPSLGYVKYSIEFNLGELKINKDFELTNDKILNEQFLYKIL
128 183
188 ETTKNIPTNNIFNSKVSQTVRLPYSLNGLYVINKGQGYRTNDKDLIGT
...

260 FTSSNNTKFSQYTERLRKDAFNVLQFNSTSLFKFVEBAPSNNKICIKAYNTFYKIELI
310 316
313

320 DYQNGSIINTAEYILSLGYCEVTNAPSSESVVKTQVAEDGFVQNGPREEIVGVDFPS
-----
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339

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-----
380 ENIQEINTAISDNVTYSIPDIVDNNPFIYLTFTVNTGTGIYKINAQNPLPLKTYEAGSSN
407 432
440 KNM

-----
1 match found in sequence:
q9r7d6 : 33kD hemagglutinin (Fragment).
(from "bt_spt.pep")
TOIG of: q9r7d6 check: 7053 from: 1 to: 13

ID Q9R7D6 PRELIMINARY; PRT; 13 AA.
AC Q9R7D6;
DT 01-MAY-2000 (TREMBlrel. 13, Created)
DT 01-MAY-2000 (TREMBlrel. 13, Last sequence update)
DT 01-DEC-2001 (TREMBlrel. 19, Last annotation update)
DE 33kD hemagglutinin (Fragment).
GN HEW33/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=Lamanna;
RA Yang G.H.;
RT "Nontoxic components of Clostridium botulinum type B progenitor
toxin.";
RL Submitted (JUL-1996) to the EMBL/GenBank/DBJ databases.
DR EMBL; U63808; AAB64348.1; -.
FT NON TER 13
SQ SEQUENCE 13 AA; 1552 MW; 98356108FA6FD041 CRC64;

Q9R7D6 Length: 13 September 1, 2004 07:07 Type: P Check: 7053
Found using 'seq23' (hayes346.key)

1 MEHYSTIQNSLND
4 7

-----
14 matches found in sequence:
q9x708 : Botulinum neurotoxin type B (Fragment).
(from "bt_spt.pep")
TOIG of: q9x708 check: 8570 from: 1 to: 441

ID Q9X708 PRELIMINARY; PRT; 441 AA.
AC Q9X708;
DT 01-NOV-1999 (TREMBlrel. 12, Created)
DT 01-NOV-1999 (TREMBlrel. 12, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE Botulinum neurotoxin type B (Fragment).
GN BONT/B.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=99343691; PubMed=10413679;
RA Lalli G., Herreros J., Osborne S.L., Montecucco C., Rossetto O.,
RA Schiavo G.;
RT "Functional characterisation of tetanus and botulinum neurotoxins
binding domains.";
RL J. Cell Sci. 112:2715-2724 (1999).
DR EMBL; AJ242628; CAB43706.1; -.
DR HSSP; P10845; 3BTA.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR InterPro; IPR008985; ConA_like_lec_gl.
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DR InterPro; IPR002160; Kunitz_legume.
KW Neurotoxin.
FT NON_TER 1 41
FT NON_TER 441 441
SQ SEQUENCE 441 AA; 52772 MW; 721D0B468E8C95A4 CRC64;
Q9X708 Length: 441 September 1, 2004 07:07 Type: P Check: 8570
Found using 'seq23' (hayes346.key)

1 YTNWTLIEIFNKYSKILNMIILNRYDRNNLIDLSGYGANVEYDGVELNDKQPKLT
46 49

61 SSTNSEIRVTQNMQIIFNSMFLDPSVFWIRIPKYKNDGIQNYIHNEYTIINCINKNSGW
108

121 KISIRGNRIIWTLDINGTKSVFPEYSIREDISYINRWF

...

166 TNSNDNAKIYNGKLESNIDIKDIGEVIANGEIIFKLDGIDRTOFIWMKYFSIFNTELS
216

226 QSNIKEIKYIQSYSEYLKDFWGNPLMYNKYMFENAGNKNSYIKLKKDSSVGEILTESKY
238 256 267

286 NQNSNTINRYNLXIGEKFIIRKKSNSQSIINDIVRKEDYIYLDFFNSRNRWVYVKDFK
291 294 324 326 341

346 EEEKLVLANIYDSNBFYKTIQIKEYDEQPTYSCQLLFFKDEBSTDIGLIGHRFYESG
363

406 TVLKDYNFPCISKWYLVKVRKPYNPNGNQWFI
411 414

-----
33 matches found in sequence:
q9zaj5 ; Bont protein.
(from "bt_spt.pep")
TOIG of: q9zaj5 check: 7881 from: 1 to: 1280

ID Q9ZAJ5 PRELIMINARY; PRT; 1280 AA.
AC Q9ZAJ5;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Bont protein.
GN BONT.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins."
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13631; CAA73972.1; -.
HSSP; P10845; 3BTA.

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DR MEROPS; M27.002; -.
DR GO; GO:0004866; F:endorpeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like Lec-gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase M27.
DR InterPro; IPR006025; Pept M Zn BS.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTXILYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1280 AA; 147487 MW; D0F748976EBC222C CRC64;
Q9ZAJ5 Length: 1280 September 1, 2004 07:07 Type: P Check: 7881
Found using 'seq23' (hayes346.key)

1 MPVINSFNYPVNDETILYMQPYEERSKYKAFEIMPVNMWIMPERDTIGTKPDEFG
33 36 34 37

61 VPDSLKNGSSAYYDPNVLTTDAEKDRY

...

149 IISNLLVLGAGPDI FKAYCTPLVRFNKSCKLIEPSNHGFGSINILTFSPYEHIFNDISG
199

209 GHNSTESFIADPAISLAHELIALHGLYGAKAVTHKESLVAERGPLMIAEKPIRLSEFL

269 TFGGEDNLIIPSAKMKIYNDLLANYEKIATRLREYNTAPPGYDINEYKDYFQWKYGLDR
287 294 316 319

329 NADGSYTVNRNKFNEIKLYSFTEIDLANKFKVKCRNTYFIKYGFVKVFNLLDDDIYTV
345 372

389 SEGFNIGNLAVNRGNINLNPKIIDSIPDKGLVEKI

...

481 NNYRNMLDEVILDYNSETIPOISNRTNLTLVQDNSYVPDYDSNGTSEIEEYDVVDNFVFF
531

541 YLHAQKVPEGETNISLTSSIDTALLEESKYVTFSEFIDTINKPVNAALFIDWISKVIR
541 571

601 DFTTEATQKSTVDKIADISLIVPEYVGLNLIIVIEAKGNFEEAFELLGAGILLEFVPELT
624 701

661 IPVILVFTIKSYIDSYENKKAIIKAINNSLIERAKWKKEIYSWISVSNWLTRINTQPNKRK
701

721 EOMYQALQNVDAIKTAIEVKYNNYTSDENRLESKNYNINNTIEELNKKVSLAMKNIERF
724 742

781 MTESSISYLMKLINAEAVGKLKEYDKHVKSDDLDTLYLHKILGEQTKEILDIVTSLNS

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815
818
863
841 SIPPESYTTNDKILIIYFNRLYKKIKDSSILDMRYENKFKFIDISGYSNISINGNVIIY
863
901 STNRNQFGIYSGRLSEVNAQNDIIYNSRYQNFISFQVWVTIPKHYRPMNRNREYTIINC
931
961 MGNNSGWKISLRTIRDCEIIWTLOQTSNKEKLIIRYBELASISDYINKWIFVITNRR
998
1021 LGNSRIYINGNLIVEKSISNLGDIHVSNDILFKIVGCCDETGVGIRYKVFNTELDKEI
1062 1067
1081 ETLYSNEPDPSILKDYWGNYLLYKYYLFLNLLRKDKYITRNSGILNINQQRGVGTGISV
1100 1107
1141 FLNKLIEGVEVIIRKNAPIDISNTDNFVRKNDLAYINVDHGVEYRLYADISITKSEKI
1144 1147
1201 IXLIRTSNPNDLSGLIIVMDSIGNNCTWVFQNDGNSIGLGFHSDDLVASSWYVNHIR
1176 1186
1261 NTSSNGCFWSFISKEHWKE
1255

-----
28 matches found in sequence:
q9zaj6 ; Ntnh protein.
(from "bt_spt.pep")
TOIG of: q9zaj6 check: 1987 from: 1 to: 1162

ID Q9ZAJ6 PRELIMINARY; PRT; 1162 AA.
AC Q9ZAJ6;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]_SEQUENCE FROM N.A.
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins";
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13631; CAA73971.1; -.
DR GO; GO:0008233; F:peptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConAlike_1ec_g1.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 1162 AA; 135251 MW; 8D0061CDF80CDD9B CRC64;
```

```
Q9ZAJ6 length: 1162 September 1, 2004 07:07 Type: P Check: 1987
Found using 'seq23' (hayes346.key)

...
81 ATVKILQRINNNVIGAKLLSLISTAISFPYEVKPGDYRQTNYLTSTKYNEHYVTANLIVFG
131
141 PGSNIKNNVVYKKEVAENGMTSEIWFQPLTYKYDQFYVDPALELIKLIKLSLYL
178
201 YGIKPSDDLSTIPYRLRSELNNSEYQDIDVDPLISGGTDYKLLNTNPNYWTIDNYFSDAPK
224 240
261 NFEKYNDYETKIKNNNDIANSIKLYLEQFKINAQNIWELNLSYFSKFEQIMPERVNN
318
321 ALNHVYKKEYYGIDYFRNRYNINGFEKQIKTNLPLSKYNKCIINKPELIVNLINQNTVM
330
381 MKSNYDGLKCTIDNFYSSYKIPYNANYEHPINYSYLDNVNIEIDKIPPINDADIYYP
398 415
441 RKNADTFIPVNNIISKEVNTTTPLPVNYLQVQITDSNDINLSSDFLEVISKGSVSF
451 469 498
501 LNTWLYLESIKYDKPIDTDKYYKWLKAIFRNYSFDITETQEISNQFGVTKIVPWIGRA
523 524
561 LNLNTNNSFMEEFKNL

...
580 ISLINKENITMPKIEIDIPNSMLNLSFKDLSENLFNISFKSNSYFKKIYDFLDQWWT
630 631
640 QYYSQYFDLICMAKKSILAQEKLIRKLIIRKLSYLGNISSDNLALMNLTTNTLRDI
642 645
700 SNESQIAMNNVDSFLNDAAICVFESNIYKFFISFMEQCINNINKOTKEFIQKCTNITENE
727
760 KLQILSPNIFSSLDPDFNENIKSLSSSETALLIKEETSPYELVLYAFQELSNNVIGDA
801
820 SGKNTSIEYSKDIGLVYGINSDALYNGSNQISF
...
880 TTKSKLIGSKEDNCGWEIYFQNTGLVFNMDISDNGDEKNIYLSDVSNNSWHYITISVDRLK
930
940 EQLLIFDDNLVNESIKEILNIYSSNIISLLSDNNASVIEGLTILNKPTTGEVLISNYF
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1000 KNLNNSYRDSNERLEYNKYQLYNVVFSKDPICEVKQNNNIYLTNTNNLNLQASKE
      1021
      1024
      1043
      1044
1060 KLLSINPNKOYQVQKDEVIIVSLDNMEKYSIDSEDNRLQLIDNKNKSAKKMIISNDIFIS
      1088
1120 CLTLYSGDKVCLSKMDKNENWMMCNNESNIPKAYLWILKEV
      1129
      1139
      1155
-----
4 matches found in sequence:
q9zaj7 : P-21 protein (Fragment).
(from "bt_spt.pep")
TOIG of: q9zaj7 check: 7638 from: 1 to: 159

ID Q9ZAJ7 PRELIMINARY; PRT; 159 AA.
AC
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE P-21 protein (Fragment).
GN P-21.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;

[1]
RN SEQUENCE FROM N.A.
RP STRAIN=CDC 3281;
RC MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins."
RL Curr. Microbiol. 37:312-318(1998).
RL
DR InterPro; IPR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 159 AA; 19326 MW; EC4A015D58049EBA CRC64;

Q9ZAJ7 Length: 159 September 1, 2004 07:07 Type: P Check: 7638 ..
Found using 'seq23' (hayes346.key)

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1 MENLFTIILKDDNKKFEDIYNYKMLIDIFIKYVNLSENYNDILNHPFWILKKADLNK
  22 25
  25 28
  42 45
  44 45
61 ENTENDLNKVIKCLXRYCLISCTKKNRDKKIYNSBITDINLNLQDNCFSDIEFEFKD
      134
121 LLSILPNNQKNIYMKFFKDKMDKDIETAKKLISRQSIYK
      134
-----
27 matches found in sequence:
q9zaj8 : Bont protein.
(from "bt_spt.pep")
TOIG of: q9zaj8 check: 8243 from: 1 to: 1291

ID Q9ZAJ8 PRELIMINARY; PRT; 1291 AA.
AC
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Bont protein.
GN BONT.

```

```

OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;

[1]
RN SEQUENCE FROM N.A.
RP STRAIN=CDC 3281;
RC MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins."
RL Curr. Microbiol. 37:312-318(1998).
RL
DR EMBL; Y13630; CAA73968.1; -.
DR HSP; P10845; 3BTA.
DR GO; GO:0004866; F:endopeptidase inhibitor activity; IEA.
DR GO; GO:0008237; F:metallopeptidase activity; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0008270; F:zinc ion binding; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like_lect_gl.
DR InterPro; IPR002160; Kunitz_legume.
DR InterPro; IPR000395; Peptidase_M27.
DR InterPro; IPR006025; Pept M_Zn_BS.
DR Pfam; PF01742; Peptidase_M27; 1.
DR PRINTS; PR00760; BONTXIIYSIN.
DR ProDom; PD001963; Bontoxilysin; 1.
DR PROSITE; PS00142; ZINC_PROTEASE; 1.
SQ SEQUENCE 1291 AA; 150840 MW; E4D3B0E46AB2E735 CRC64;

Q9ZAJ8 Length: 1291 September 1, 2004 07:07 Type: P Check: 8243 ..
Found using 'seq23' (hayes346.key)

1 MPVTINNFNYPIDNNIIMBPPFARGMGYYKAPKITDRIWIIPERYTFGYKPEDFN
  33 36
  34 37
  33 36
  34 37
61 KSSGIFNRDVCYEDPDYLTNDKNI
...
149 ERKKGIFANLIIFGPGVLNENETIDIGIQNHFASSREGFGIMQMKFCPEYVSFVNNVOE
      199
      199
209 NKGASIFNRGYFSDPALILMHHLIHLGLYGIKVNLDLPVFPNKKFFMQSDAIQAE
      421
269 LYTFGGDPSIIISPSDTKSTYDKVLQNFGRGIVDRLNKVLVCI SDPNININIKNPKDKV
      289
      289
      329
      331
      349
      349
389 NEIYTBEGFNISDKNWEYRGQNKAINQAYEEISKEHLAVYKIQMCKSVKAPGICID
      421
449 VDNEDLFFIADKNFSDDLAKNERIAYNNTQNNYIENDFSINELILDTLISKIETLPSNT
509 ESLTDENVVVPYVKQPAIKKIFTDENTIFQYLYSOTFFPLDIRDISLTSSFDALLFSNK
      517
569 VYGFSDMDYIKTANKVVEAGLFAGVWKVQIVDDFVIBANKSSTMKDIADISLIVPYIGLAL
      570
      570
629 NVGNETAKGNFENAFIAGASILLFPELLIPVVGAFLLLESYIDNKNKIETINSALT
      623
      623

```

689 RDEKIDWYGLIVAQWLTSTVNTQFYTIKEGMYKALNYQAALIEIIKYKINIYSBKRSN 697 |--| |--| |--| 720 738

749 INIDPNDVNSKLINEGINQAIDNINNFINESVSYLMMKMIPLA 720 |--| |--| |--| 738

... 720 |--| |--| |--| 738

838 FDLSTYTNTTILIEIFNKYNKDILANNIILNRYDRNKLIDLSSYGAKVEVYDGVKLNKN 888 |--| |--| |--| 898

898 QFKLTSSANSKIRVIQONQNIIFNSMFLDFSFSFWIRIPKYKNDGIQNYIHNEYTIINCWK 950 |--| |--| |--| 950

958 NNSGWKISIRGNMIITWLTIDNGIKSVFFYSIKEDISEYINRWF 950 |--| |--| |--| 950

... 950 |--| |--| |--| 950

1008 TNSDNAKIYINGKLESHIDIRDIREVIANDEIIPKIDGNIDRTQFIWMKYFSIENTELS 1058 |--| |--| |--| 1058

1068 QSNIBEIYKIQSYSEYKDFWGNPLMYNKYMFNAGNKNSYIKLKKDSSVGEILLTRSKY 1080 |--| |--| |--| 1098 1109

1128 NQNSKYINRDLYIGEKFTIRKKSNSQSINDDIVRKEDYIYLDFFNLNQEWRYMYKYFK 1133 |--| |--| |--| 1166 1183

1136 |--| |--| |--| 1168

1188 KEEKLFLAPISDSDEFYNTIQIKEYDEQPTSCYQLLFKKDESTDIGLIGHIRFYESG 1205 |--| |--| |--| 1205

1248 IVFKYKDYFCISKWYKVEKRPYNSKLGCMWQFIPKDEGWTE 1253 |--| |--| |--| 1256

24 matches found in sequence:
q9za9 : Ntnh protein.
(from "bt_spt.pep")
TOIG of: q9za9 check: 3660 from: 1 to: 1197

ID Q9ZAJ9 PRELIMINARY; PRT; 1197 AA.
AC Q9ZAJ9;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE Ntnh protein.
GN NTNH.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
RT complex in a strain of clostridium botulinum producing type B & F
RT neurotoxins."
RL Curr. Microbiol. 37:312-318 (1998).
DR EMBL; Y13630; CAA73967.1; --
DR GO; GO:0008233; F:peptidase activity; IEA.

DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR GO; GO:0006508; P:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; Cona like lec gl.
DR InterPro; IPR000395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 1197 AA; 138716 MW; 974B4480D6675EBB CRC64;
Q9ZAJ9 Length: 1197 September 1, 2004 07:07 Type: P Check: 3660 ..
Found using 'seq23' (hayes346.key)
...
60 DGGIYDSNFLSQSEKDFLOAIITLLKRINSTNAGEKLLSLISTAIPPPYGYGGYYA 110 |--| |--| |--| 110

120 PNMITFGSAPKSNKLNLSLSTIPFPYAGYRETNYSLEDNKSFYASNIVIFGPGANIV 147 |--| |--| |--| 147

180 ENNTVFKKEDAEKMGMTWTETWQPFLLTYKYDFYIDPAIELIKLIKSLYFLYGIKES 211 |--| |--| |--| 231

240 DDLVPIYRLRSELENIEYSOLNIVDLLVSGGIDPKPFINTDPYWFDTNYSNAKKVFEHR 257 |--| |--| |--| 257

300 NIYETEIEGNN 300

... 300

313 GNDIKLRUKQKFRININDIWEINLNINYSKESFIMMPDRFNNAKHKFYRQYKIDYPENY 363 |--| |--| |--| 363

373 SINGFVNGQ1NAQLSLSDRNQDIINKPEIINLLGNVSVLSMRSNYIGDLKSTVDFFYS 431 |--| |--| |--| 431

433 NYKIPYNRAYEYHFNNSSLDNVNIGVIDNIPETIDVNPYKENCDFSPVQKITSTRE 434 438 |--| |--| |--| 438

493 INTNTPWPINYLQAQNTNNEKFSLSDDFVEVVSXKDKSLVYGSFLSNVMFYLDLSIKDNSPI 503 |--| |--| |--| 533

553 DTDKKYLLMLREIFRNYSPDITATQETINDCGINKVVTWFGKALNLTNTSDSPVEBFQNL 558 |--| |--| |--| 558

559 |--| |--| |--| 559

... 559

615 ISLINKENLSMPEITEIYGPNDMLGLPLNDLNEKLFNLYKNILYFKVKVYENFLDQWWT 665 |--| |--| |--| 665

675 EYXSYQFDLICMAKQSILAQEKLIQIIONKLDLPKADISMDKLNLMNLATEKTFIDL 677 |--| |--| |--| 677

680 |--| |--| |--| 680

... 680

785 KCTNTEDEKLQLIKLNTFMNIDFEFFDIQSIKLTITSETDLIKEKESDYNLFLETLQES 785 |--| |--| |--| 785

```
845 DNKVIEDISGKNTLVKYSISLVYGVNGDALYLKEPDESVSF 835
...
914 IITSKLJENKADNCWEIYFENNGLVFSIVDCNGNEENIVLSDVISKWYISIDRLR 964
974 NQLLIFINDKLIANQSEIQLNIYSSNTISLVNENNPIYIEGLSILNRSITSEEVNNYF 1032
1034 SYLNNYSYRDISGERLEVNKTYELNYVFPENSLYEVTENNNIYLSIKDNTNMLNQAKF 1077
1094 KLINIDANKOVQKWDEGVVCLLDEEKYVDISSENNRIQLVSSKDTAKRIIFNNDIFRP 1122
1154 NCULTFAYNNKYLSSLSLRDRNRYNNWMCNNNNNIPKAHLWALKGI 1174
-----
6 matches found in sequence:
q9zak0 ; HA-33 protein.
(from "bt_spt.psp")
TOIG of: q9zak0 check: 3410 from: 1 to: 293
ID Q9ZAK0 PRELIMINARY; PRT; 293 AA.
AC Q9ZAK0;
DT 01-MAY-1999 (Tremblrel. 10, Created)
DT 01-MAY-1999 (Tremblrel. 10, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE HA-33 protein.
GN HA-33.
OS Clostridium botulinum.
OC Bacteria; Firmicutes; Clostridia; Clostridiales; Clostridiaceae;
OC Clostridium.
OX NCBI_TaxID=1491;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=CDC 3281;
RX MEDLINE=98440323; PubMed=9767710;
RA Santos-Buelga J., Collins M.D., East A.K.;
RT "Characterization of the genes encoding the Botulinum neurotoxin
complex in a strain of clostridium botulinum producing type B & F
neurotoxins.";
RL Curr. Microbiol. 37:312-318(1998).
DR EMBL; Y13630; CAA73965.1; -.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 5.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 293 AA; 33865 MW; 96E579595D6C802F CRC64;

Q9ZAK0 Length: 293 September 1, 2004 07:07 Type: P Check: 3410 ..
Found using 'seq23' (hayes346.key)

1 MEHYSVLQNSLNDKIVTISCRADTNLFYQVAGNVSLFQOTRNYLERWRIYDSNKAAKY 29 32
4 7
61 IKSMIDHNTNLVLTWNPATPHNISQDQSNADNOYWLILKDIGNNSFIASYPKPNLVLYA 94 97
99 97

835
DTVARNLKLSTLNNNSYIKFIIEIDYIIISDFNNFTCKISPILDRNKVVQVATTNINVLNLY 137
181 TWYGRNQKWTIRYNEKAAYQFENTILSGVLTWIFSGNGTVRVSSNDQNNDAQYWLII 237
241 NPVSDTDTYITNLRDTTKALDLYNSQTANGTAIQVFNSSNGGDNQKNNI
...
-----
5 matches found in sequence:
q9zwv4 ; HA1.
(from "bt_spt.psp")
TOIG of: q9zwv4 check: 1195 from: 1 to: 291
ID Q9ZWV4 PRELIMINARY; PRT; 291 AA.
AC Q9ZWV4;
DT 01-MAY-1999 (Tremblrel. 10, Created)
DT 01-MAY-1999 (Tremblrel. 10, Last sequence update)
DT 01-OCT-2003 (Tremblrel. 25, Last annotation update)
DE HA1.
GN HA1.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873, and CB16;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
botulinum type D strain, 1873.";
RL Microbiol. Immunol. 42:599-605(1998).
RN [2]
RP SEQUENCE FROM N.A.
RC STRAIN=CB16;
RX MEDLINE=96025415; PubMed=8569530;
RA Ohyama T., Watanabe T., Fujinaga Y., Inoue K., Sunagawa H., Fujii N.,
Oguma K.;
RT "Characterization of nontoxic-nonhemagglutinin component of the two
types of progenitor toxin (M and L) produced by Clostridium botulinum
type D CB-16.";
RL Microbiol. Immunol. 39:457-465(1998).
DR EMBL; AB012112; BAA75082.1; -.
DR EMBL; AB012111; BAA75077.1; -.
DR InterPro; IPR008997; RicinB like.
DR InterPro; IPR000772; Ricin B lectin.
DR Pfam; PF00652; Ricin B lectin; 6.
DR SMART; SM00458; RICIN_2.
DR PROSITE; PS50231; RICIN B LECTIN; 2.
SQ SEQUENCE 291 AA; 34226 MW; EFE7E23C9F9C2F3B CRC64;

Q9ZWV4 Length: 291 September 1, 2004 07:07 Type: P Check: 1195 ..
Found using 'seq23' (hayes346.key)

...
47 SGANQKRWLIYDTNKQAYKIKVMDNTSLILTNAPLSSVSVKTDITNGDNGYVLLQWYIS 97 100
107 RNVLIIRYNNPNVLQVNIIDDTLWVSTQTSSSNQPFKFSNCIYEALNNRNCKLQTLNSD 149
167 RFLSKNLSQIIVLWQWFDSSRQKWIIEYNETKSAYTLKQENNRVLTWQNSNNYVETY 212
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227 235 248
|---| |---|
OSTDLSIQWNNYLDNDASKYILNQTRVLDVYNSQIANGTHVIVDSYHGNTNQW
235 248

287 IINLI

-----
9 matches found in sequence:
q9zwv5 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q9zwv5 check: 6358 from: 1 to: 179
PRT; 179 AA.

ID Q9ZWV5 PRELIMINARY; PRT; 179 AA.
AC Q9ZWV5;
DT 01-MAY-1999 (TREMBlrel. 10, Created)
DT 01-MAY-1999 (TREMBlrel. 10, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE ORF-22.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohya T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RL botulinum type D strain, 1873.";
DR GO:0008233; F:peptidase activity; IEA.
DR EMBL; AB012112; BAA75074.1; -
DR GO:0015070; F:toxin activity; IEA.
DR GO:0009405; F:pathogenesis; IEA.
DR GO:0006508; F:proteolysis and peptidolysis; IEA.
DR InterPro; IPR008985; ConA_like lec gl.
DR InterPro; IPR00395; Peptidase M27.
DR Pfam; PF01742; Peptidase M27; 1.
DR PRINTS; PR00760; BONTOXILYSIN.
DR ProDom; PD001963; Bontotoxylisin; 1.
SQ SEQUENCE 1196 AA; 138670 MW; C3716F6A270AFA95 CRC64;
Q9ZX77 Length: 1196 September 1, 2004 07:07 Type: P Check: 6358
Found using 'seq23' (hayes346.key)

...

60 DGGIYDSNLSQDSERENFLQAIILLKRINNTISGKQLLSLISTAIPPPYGYGGYSS
110
120 PNIFFGKTPSKNKLNSLVTSTIFFPGGYRETNVIESQNNKNFYASNVIVFGPGSNIV
180 ENNVYKKNDANGMGMTMAEIVFQPLLTYKYNKFVIDPAMELTCLIKSLYFLYGIKPS
211
240 DNLVVPRLRTELDNKKFSQLNIIDLLISGGVDLEFINTPNYFWFTNSYPNSIKMPEKYK
298
300 NIYKTEIEGNNAGNDIKLRKQKFQINVQDIWNLNLNYFCQSFNSIIPDRFSNALKHFY
301
360 RKQYTYMDYTDNYINGFVNGQINTKPLSNKNTNIISKPEKVVNLVNNENNISLMKSNY
363
420 GDGLKGSTEDFYSTYKIPYNEEYERFNDSDNPPLNNISIEVDSIPEIIDIINPYKQNSD
431
480 NLVFTQITSMTEEVTHALTALSYLQAIQTNNENFTLSSDFSKVSSKDKSLVYSLDNL
503
540 MSYLETIKNDGPDITDKKYLLWLVKEVFNKYSFDINLTQBIIDSMCGINEVVLWFGKALNIL
558
559
600 NTSNSFVEEYQDSGAISLISKDKNLREPNIEDDISLGLSKFOLNNKNNKLYEYSKNIV
651
```

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227 235 248
|---| |---|
OSTDLSIQWNNYLDNDASKYILNQTRVLDVYNSQIANGTHVIVDSYHGNTNQW
235 248

287 IINLI

-----
9 matches found in sequence:
q9zwv5 ; ORF-22.
(from "bt_spt.pep")
TOIG of: q9zwv5 check: 6358 from: 1 to: 179
PRT; 179 AA.

ID Q9ZWV5 PRELIMINARY; PRT; 179 AA.
AC Q9ZWV5;
DT 01-MAY-1999 (TREMBlrel. 10, Created)
DT 01-MAY-1999 (TREMBlrel. 10, Last sequence update)
DT 01-OCT-2003 (TREMBlrel. 25, Last annotation update)
DE ORF-22.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RC STRAIN=1873, and CB16;
RX MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohya T., Watanabe T., Inoue K., Oguma K.;
RT "Characterization of nontoxic-nonhemagglutinin component of the two
RL types of progenitor toxin (M and L) produced by Clostridium botulinum
RT type D CB-16.";
DR EMBL; AB012112; BAA75079.1; -
DR EMBL; AB012111; BAA75074.1; -
DR InterPro; IPR009043; RNA_pol_sigma.
SQ SEQUENCE 179 AA; 22032 MW; 97B1A9D6BA48DBA6 CRC64;
Q9ZWV5 Length: 179 September 1, 2004 07:07 Type: P Check: 6358
Found using 'seq23' (hayes346.key)

...

61 MNDLFYAIBNLKDHQNFIEBMSLKKYIEKTSKYNLYDYNDILYHLWKELIBNLK
36 39 43 46 51
39 42
40 43
61 NFNSBLDKYISTSIKRYCINICKKNNRDKKIYNSEVYTKLDVANNVYSLYCDNFEL
101
121 DLISILNYKEQIIYWKFFEGRKDNIEAIRLRLRSQSIYKIRIKSLKLYPIVMQLVNI
135
170
24 matches found in sequence:
q9zx77 ; NTNH.
(from "bt_spt.pep")
TOIG of: q9zx77 check: 1583 from: 1 to: 1196
PRT; 1196 AA.

ID Q9ZX77 PRELIMINARY; PRT; 1196 AA.
AC Q9ZX77;
DT 01-MAY-1999 (TREMBlrel. 10, Created)
```

```

660 YFKKIYPSFLDQWTEYYSQVFEIICWAKQSILAQESLVKQIVQNKFTDLSKASIPDPDL
    665          |---| |---| |---|
    677          |---| |---| |---|
    680          |---| |---| |---|
720 KLIRETTEKTFIDLNSBSQISMNRVDNFLNKASICVFVEDIYPKFISYMEKYINNINIKT
    761          |---| |---| |---|
780 REFIQRCNTNDEKSELINSYFTKTDIFKFLDIQSIKNFFNSQVQMKELISPYQLLL
    835          |---| |---| |---|
840 FASKGPSNIIIEDISGKNTLIQYTESIELVGVNGESLYLKSPNETIKF
...
914 DDKTRLIGNKVNCGWEIYFEDNGLVFEIIDSNGNQBSVYLSNIINDNWWYISISVDRLK
    964          |---| |---| |---|
974 DQLLIFINDKNVANVSIDQILSIYSTNIISLVNKNNSIYVEELSVDLNPITSEVIRNYF
    1032          |---| |---| |---|
1034 SYLDSNYIRDSSKSLLEYKNYQLYNVVFPETSLYEVNDNKNKSYLSKNTDGINISSVKF
    1035          |---| |---| |---|
    1055          |---| |---| |---|
    1058          |---| |---| |---|
1094 KLINIDESKYGQWDBCIICVLDGTEKYLDISPENNRNIQLVSSKONAKKITVNTDLFRP
    1122          |---| |---| |---|
1154 DCITFSYNDYFSLSLRGLDYNWMMICNDNNKVPKGAHLWILES
    1164          |---| |---| |---|
    1174          |---| |---| |---|
-----
4 matches found in sequence:
q9zx78 ; HA2.
  (from "bt_spt.pep")
  TOIG of: q9zx78 check: 8763 from: 1 to: 146
ID Q9ZX78 PRELIMINARY; PRT; 146 AA.
AC Q9ZX78;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-OCT-2003 (TrEMBLrel. 25, Last annotation update)
DE HA2.
GN HA2.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=1873;
RC MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RT botulinum type D strain, 1873.";
RL Microbiol. Immunol. 39:457-465(1998).
DR EMBL; AB012111; BAA75075.1; -
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTERTOXN.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 146 AA; 16672 MW; B86315B974DFR3FD CRC64;
Q9ZX78 Length: 146 September 1, 2004 07:07 Type: P Check: 8763 ..

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Found using 'seq23' (hayes346.key)
1 MSSERTPLPNGYKIKLSFSDSLYLTSSGALSPPTSSLDNQKWKLEYISSSNGFRFSN
    24 27
61 VAENKLYANDYGFYILSSSSNNSLNPIKIALNSYIICTLSIVNVTDYAWTIYDNNNN
    67 70 73 76
    70 73
121 ITDQPI
...
-----
19 matches found in sequence:
q9zx79 ; HA3.
  (from "bt_spt.pep")
  TOIG of: q9zx79 check: 5189 from: 1 to: 623
ID Q9ZX79 PRELIMINARY; PRT; 623 AA.
AC Q9ZX79;
DT 01-MAY-1999 (TrEMBLrel. 10, Created)
DT 01-MAY-1999 (TrEMBLrel. 10, Last sequence update)
DT 01-JUN-2003 (TrEMBLrel. 24, Last annotation update)
DE HA3.
GN HA3.
OS Clostridium botulinum D bacteriophage.
OC Viruses.
OX NCBI_TaxID=29342;
RN [1]
RP SEQUENCE FROM N.A.
RX STRAIN=CB16;
RC MEDLINE=99017546; PubMed=9802560;
RA Nakajima H., Inoue K., Ikeda T., Fujinaga Y., Sunagawa H., Takeshi K.,
RA Ohyama T., Watanabe T., Inoue K., Oguma K.;
RT "Molecular composition of the 16S toxin produced by a Clostridium
RT botulinum type D strain, 1873.";
RL Microbiol. Immunol. 42:599-605(1998).
DR EMBL; AB012111; BAA75075.1; -
DR GO; GO:0005576; C:extracellular; IEA.
DR GO; GO:0015070; F:toxin activity; IEA.
DR GO; GO:0009405; P:pathogenesis; IEA.
DR InterPro; IPR003897; Clenterotox.
DR Pfam; PF03505; Clenterotox; 2.
DR PRINTS; PR01394; CLENTERTOXN.
DR SMART; SM00458; RICIN; 1.
SQ SEQUENCE 623 AA; 70564 MW; 8524F8AF54780669 CRC64;
Q9ZX79 Length: 623 September 1, 2004 07:07 Type: P Check: 5189 ..
Found using 'seq23' (hayes346.key)
...
20 NLADGVVNRGSGWILSRQNLGNNISNGCTAIVGDLIRRETATPYPTAFNEEY
    70 73
80 IKNVQNVFANFTEASEIPIGFEPFSKTPSNKSLMYLQYIRYRIEIKVLQNTVTEAAV
    114 119 124

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116 121
140  LXVPSLGYVKSIEFPNSEEQIDKNFYFTSQDKCILNEKFIYKKIDDTITVKESKNSNNIN
179
200  FNTSQTILPYPNGLYVINKDGYMRINDKDLICLLLESSTSGSIIQPLRLNRTTRELPLNT
269
260  SNPTIFSQYTEARLNDAFNIQLENTSTTLFKFVEEAPTNNKISMKVNTYKYELINYQ
307 313
310
320  NGNIDDKAEYILFSLGKCEVSDAPSPQAPVETFDQDGFIOGTGNENIIVGVINPSENI
380  EEISTPIPDYTVNIPTSIQNNACVYLFKVNITGVYKITTNNLPLLIYEALIGSSNRNM
404
440  NNNLSNDNIKAIKYITGLNRSDAKSYLIVSLFKDKXYYIRIPQISSSTTSQLIFKRELG
466 478
500  NISDLADSTVNILDNLNTSGTHYTRQSPDVGNVYISYQLTIPGDFNNIASSIFSFRNN
533
560  QGIGTIYRLTESINGYNLITINNYSDLLNNVEPISLLNGATYIFRVKVTENLNNYNIIPDA
575 583 613
620  YRNS

Times:          -- Search Statistics --
      CPU          Total Elapsed
00:00:00.03      00:00:04.00

Number of sequences searched:      163
Number of sequence hits:          140
Number of separate matches:       1698
Number of sequence hits saved:      0
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